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ABSTRACT

This paper reports on two comprehensive multi-institutional collaborative efforts for school improvement. The two studies demonstrate that collaborative efforts involving multiple agencies and multiple agendas can be successful even when separated by considerable geographical distance. The school systems were concerned with implementing a locally developed curriculum; researchers, meanwhile, were investigating the implementation process and providing training. The conceptual framework used in both programs, the Concerns Based Adoption Model (CBAM), is summarized. Its diagnostic dimensions (Stages of Concern about the Innovation, Levels of Use of the Innovation, and Innovation Configuration) are discussed. The planning, implementation, and evaluation of the two case studies are summarized: the Jefferson County (JeffCo) (Colorado) Schools program to improve elementary science curriculum and instruction; and the Palm Beach (Florida) Schools development and implementation of the Unified Curriculum program. The JeffCo case provides a clear example of a concerns-based implementation effort and illustrates how the diagnostic dimensions of the CBAM can be used to plan, monitor, and intervene in improvement efforts. Addressing teacher concerns is emphasized. The Palm Beach study emphasizes principal inservice training for the role of implementaion facilitation. The collaboration of research teams from schools mentioned above and from the Research and Development Center for Teacher Education at the University of Texas at Austin led to the formulation of seven key principles for school improvement; six important unresolved issues are also presented. (BS)

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INTERNATIONAL SCHOOL IMPROVEMENT PROJECT

CASE STUDIES OF SCHOOL IMPROVEMENT

A CONCERNS BASED APPROACH

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CASE STUDIES OF SCHOOL IMPROVEMENT: A CONCERNS BASED APPROACH[1,2,3]

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Around the globe the banner of school improvement flies hopefully over school buildings large and small, old and new, elegant and ugly. Improvement efforts, at this moment, are underway in the snowy northern climes of various provinces, in the hot and dry terrain of many lands, in steamy areas of other countries. In widely separated states of the North American continent -- Colorado, Florida, and Texas -- two comprehensive multi-institutional school improvement efforts occurred. They are summarized in this paper. The two studies demonstrate that collaborative efforts involving multiple agencies and multiple agendas can be successful even when separated by considerable geographical distance. The participants in these case studies included teachers, curriculum developers, staff developers, principals, school administrators, evaluators and researchers. The efforts were intensive, resulted in growth for all participants and were documented by qualitative and

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[1]Paper presented at the meeting of the International School Improvement Project, a project of OECD/CERI, Palm Beach, Florida, November 1-6, 1982.

[2]The development of this paper was supported in part by the ISIP project and in part by Jeffco and Palm Beach Schools and the Texas R&D Center.

[3]The research described herein was conducted under contract with the National Institute of Education. The opinions expressed are those of the authors and do not necessarily reflect the position or policy of the National Institute of Education. No endorsement by the National Institute of Education should be inferred.

quantitative data that confirm that positive outcomes and accomplishments resulted. In addition the studies produced new ideas about how to make future school improvement efforts even better.

The experiences and institutional activities that are summarized here clearly resonate with the principles that have been articulated by the International School Improvement Project (ISIP) (Van Velzen, 1982). Although the ISIP project had not been created at the time that these improvement efforts began, the experiences reinforce the guiding principles advanced in the ISIP project.

The participants in this set of cases shared a common conceptual framework of the change process. This conceptual framework is outlined in the Concerns Based Adoption Model (CBAM), (Hall, Wallace & Dossett, 1973). While implementation of locally developed curriculum was the primary concern of the Colorado and Florida practitioners, research on the implementation process was of major interest to the Texas researchers. Through the use of the shared conceptual framework of the Concerns Based Adoption Model all of the agenda could be addressed. In addition, all parties could use common language for understanding, communicating, facilitating, monitoring and evaluating the improvement efforts.

This paper is organized so that the reader can learn about the inter-institutional collaborative efforts, the improvement processes used and the research that was conducted. In the first section the diagnostic dimensions of the Concerns Based Adoption Model which were used in these cases are summarized. These diagnostic dimensions are Stages of Concern about the Innovation, Levels of Use of the Innovation and Innovation Configurations. Some mention will be made of the

research that focused on the concept of intervention. New understanding about the characteristics of interventions was a key outcome of the school improvement processes and the experiences that are summarized in these cases.

The second major section of the paper introduces the first of the two case studies, the implementation of the Revised Science Curriculum in Jefferson County, Colorado. This section is followed by the description of improvement efforts in the Palm Beach County school district in Florida. In Palm Beach the focus of the improvement effort was on implementation of the Unified Mathematics Curriculum in elementary schools. A brief summary highlights critical features and some key principles that were gained from the two studies and which appear to have important implications for future improvement efforts. The paper concludes with a discussion of some unresolved issues along with suggestions for future research, development and refinement of school improvement practices.

The Participants

The staffs of three different agencies in three different parts of the United States are the major actors in this collaborative effort. One staff was led by central office science curriculum coordinators and administrative staff developers in Jefferson County, Colorado (JeffCo). The second staff was directed by the staff development office of Palm Beach County Schools, Florida. The third staff was the team of researchers at the Research and Development Center for Teacher Education (Texas R&D Center) at the University of Texas at Austin, who were studying the change process in schools and colleges.

In the years before 1975 the JeffCo district had surveyed teachers, parents and others about the needs in elementary school science and had moved through the district procedures for developing new curriculum. In 1976 they were ready to implement the newly developed and tested curriculum district wide. The Texas group at that time was preparing to launch a major longitudinal study of implementation. The two groups joined forces to facilitate and study the implementation of the JeffCo Revised Science Curriculum.

Data were collected over the next four years. As the district used the diagnostic dimensions of the Concerns Based Adoption Model to facilitate the implementation effort in 80 elementary schools, the Texas staff used the same concepts to systematically study the implementation process in a subset of twenty elementary schools. The study placed heavy emphasis on analyzing what occurs at the individual teacher and classroom level when educational innovations are introduced.

In 1978 the Palm Beach County staff began to make plans to implement a Unified Mathematics curriculum in elementary schools. They contacted JeffCo staff to see what could be learned that could be applied in the Florida implementation effort. The Texas group joined the Florida effort to again study implementation, but this time with a heavy focus on the role of the school principal. Again the CBAM concepts were used in training personnel and in facilitating the implementation effort.

The two cases and their stories, which comprise the bulk of this paper, are similar in several respects. They report the effort of two rather large school districts. Each is large in terms of student population and in geographical size. Each district's effort was based

on a locally developed curriculum innovation and the implementation process was guided by strong central office staff developers and curriculum consultants.

The reports of the two stories unfold in rather parallel fashion though there are obvious differences. The extensive description in the JeffCo case is a clear example of a concerns based implementation effort and illustrates and explains how the diagnostic dimensions of the CBAM can be used to plan, monitor and intervene in improvement efforts. A great deal of detail is included about the inservice interventions provided for teachers, which illustrates how interventions can be designed to address teachers concerns. The Palm Beach story which follows is more concise and emphasizes the inservice training of principals for the role of implementation facilitation. The Palm Beach story began to develop approximately two and a half years after the JeffCo study. Key leaders in the Palm Beach district maintained contact with their counterparts in the JeffCo experience, thus what was learned in JeffCo could be adjusted and applied in the Palm Beach implementation effort.

With both districts the staff from the Texas R&D Center studied the implementation process and provided training for the change facilitators. Although the R&D Center staff were agents external to the districts they became equal partners in the implementation efforts. One important consequence was the opportunity for the districts to have access to the newest concepts out of implementation research and it was possible for researchers to have the opportunity to study closely large scale improvement efforts as they unfolded.

An Organizing Framework

Since there are so many variables and processes to consider, we would like to use a simple framework to organize this paper and our ideas about school improvement. This framework was born out of our discussions about the distinctions between school improvement, the school review process, implementation and the roles of school leaders, evaluators and policy makers. The major blocks in the framework are the School Review Process, Solution Selection/Development and Solution Implementation. Graphically the framework is illustrated in Figure 1.

SCHOOL IMPROVEMENT PROCESSES

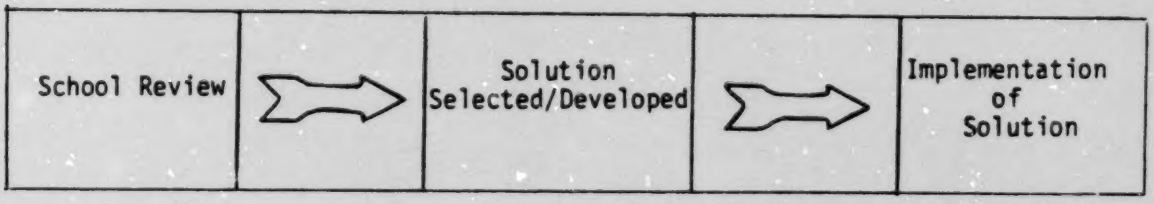

Figure 1 Organized Framework for Viewing School Improvement Processes

The school review process incorporates the period of time and activities that occur as a school staff reviews and examines its strengths, weaknesses and problems in relation to its goals. This process will normally include all or nearly all of the school staff and draw upon the advice and expertise of agents external to the school.

The outcome of the school review process is the identification of one or more "solutions" that if adopted could lead to improved school practice. In some instances potential solutions may already be available from outside agencies, such as publishers. In other cases such as with JeffCo and Palm Beach the schools develop their own solution.

Implementation of the selected solution is the third major segment of the school improvement process. Identifying solutions and ignoring implementation or treating implementation as an event will mean that little or no change in school practice results from the review process. The implementation process takes time and resources just as the review and development processes do.

Thus, there are three major segments that must be considered, School Review, Solution Selection/Development and Solution Implementation. We should note that others have used a similar framework. For example, Vandenberghe (1982) has suggested a slightly different partitioning of the latter segments.[4]

As the case studies are introduced and described in this paper, the framework will be used to organize the various concepts, findings and

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[4]He suggests that "the way schools prepare themselves for the adoption" can be called mobilization and that implementation refers to the activities and problems that occur during the first two years of use.

recommendations that are discussed. In this way we hope that the reader will be able to maintain an overall perspective of the school improvement process while at the same time studying the details of particular school improvement efforts.

The Concerns-Based Perspective of School Improvement

One perspective for describing and understanding the improvement process is outlined in the Concerns Based Adoption Model (CBAM) which has been under development at the Texas R&D Center. It is this framework that has been used in the JeffCo and West Palm Beach efforts to guide and monitor implementation. In the CBAM Model much attention is given to understanding the individual who is learning to use new products and processes and to describing these "innovations" in ways that can make the change/improvement process more effective and personalized.

The concerns-based perspective can be highlighted by quickly reviewing several of the basic assumptions that underline the model. The first assumption and one that has received a great deal of attention in recent years is that change is a process not an event. New practices and materials are not simply placed in use by schools and individual teachers at a singular point and time. Rather there is a process of familiarization with alternatives, selecting a particular solution and then implementing that solution. Thus, in understanding school improvement from a concerns-based perspective it is essential to consider school improvement as being a process, not an event.

Another key assumption in the CBAM Model is that the change process must be understood from the point of view of the many individuals who are participants in it. Change cannot simply be viewed in terms of the

larger organizational factors or groups or in terms of the ultimate goals of the change effort. School improvement is a process that teachers, administrators and others will experience individually as well as collectively. The individual members of an organization must be considered.

A related assumption is that for individual members of the organization there is a personal side to change. Personal feelings and perceptions must be taken into account by managers of the change process. Further, it is assumed in the CBAM Model that at the individual level the change process entails developmental growth in feelings about the innovation and skill in using it.

Based upon these assumptions, in the Concerns Based Adoption Model change facilitators, those administrators and others who have responsibility for facilitating change, must "intervene" in ways that are consistent with the developmental levels of the clients (i.e. teachers). These interventions include workshops, sending memos, consultations in a hallway and all other forms of support and/or hindrance that occur during the change process. Thus, it is possible from a concerns-based perspective to plan, monitor and facilitate the change process across time by being aware of the developmental state of individuals, subgroups and the entire organization.

A key to being able to work in these different ways is to have an understanding of the three diagnostic dimensions of the Concerns Based Adoption Model: 1) Stages of Concern about the Innovation, 2) Levels of Use of the Innovation and 3) Innovation Configurations. Each of these diagnostic dimensions will be described in some detail in the remainder of this section.

Stages of Concern about the Innovation

To better understand the personal side of the change process the researchers at the R&D Center turned to earlier work that had been done around the concept of "concerns" by Frances Fuller (1969). In her pioneering work she proposed that student teachers as they move through preservice teacher education programs move through a series of levels or phases of concerns about teaching.

Fuller found that initially student teachers' concerns were completely unrelated to teaching. They had concerns, but they did not relate to the topic of teaching. Their concerns would be about academic course work or getting along with their roommate or some other non teaching related topics.

The first student teaching related concerns had a self focus to them. Preservice teachers had concerns about their own adequacy to teach and to control children. They had concerns about getting to and from schools and about the evaluations they would receive from their supervising teachers.

As these concerns were resolved task concerns became more intense. These are concerns about the management of instruction and the many little tasks that are a part of teaching. Ultimately, student teachers' concerns about teaching shifted to more impact related topics. These impact related concerns had to do with how they could improve their skills as teachers so that learning occurred in their students.

Based on their field notes and clinical experiences the change process researchers at Texas hypothesized that the concerns phenomenon of student teachers, as described by Fuller, could be applied to teachers in service and others as they were involved in change. Through

a series of measurement development activities and subsequent field studies it was confirmed that in fact there was a similar dynamic to the concerns that practicing teachers and college faculty experience as they are involved in change (Hall & Rutherford, 1976). This new formulation of concerns was named Stages of Concern about an Innovation (SoC). In total, seven different Stages of Concern have been identifed and described. These Stages of Concern about an Innovation are summarized in Figure 2.

Assessing Stages of Concern

Three different procedures have been developed for assessing Stages of Concern. Two are particularly useful to practitioners and the third is more useful for research and evaluation purposes. All three will be highlighted here since all were used in the case studies. The first technique for assessing concerns is through a "one legged conference" where the principal, staff developer or other change facilitator carries out a one to five minute conversation with a teacher, as they are casually walking along (thus, the name -- "one legged conferences"). In this conversation it is possible for a trained change facilitator to estimate the concerns of the teacher. Of course the change facilitator is then expected to "intervene," based on his or her diagnosis.

A more systematic way to assess concerns is through the use of the Open Ended Concerns Statement (Newlove and Hall, 1976). In this format teachers are asked to write a paragraph that describes their concerns about the school improvement process, a particular set of curriculum materials or whatever the innovation is. These written concerns can be content analyzed to identify particular topics of concern to teachers and also the Stages of Concern that are most intense. This technique is

Figure 2

STAGES OF CONCERN ABOUT THE INNOVATION*

	STAGES OF CONCERN	DEFINITIONS
IMPACT	6 REFOCUSING	The focus is on exploration of more universal benefits from the innovation, including the possibility of major changes or replacement with a more powerful alternative. Individual has definite ideas about alternatives to the proposed or existing form of the innovation.
IMPACT	5 COLLABORATION	The focus is on coordination and cooperation with others regarding use of the innovation.
IMPACT	4 CONSEQUENCE	Attention focuses on impact of the innovation on student in his/her immediate sphere of influence. The focus is on relevance of the innovation for students, evaluation of student outcomes, including performance and competencies, and changes needed to increase student outcomes.
TASK	3 MANAGEMENT	Attention is focused on the processes and tasks of using the innovation and the best use of information and resources. Issues related to efficiency, organizing, managing, scheduling, and time demands are utmost.
SELF	2 PERSONAL	Individual is uncertain about the demands of the innovation, his/her inadequacy to meet those demands, and his/her role with the innovation. This includes analysis of his/her role in relation to the reward structure of the organization, decision making, and consideration of potential conflicts with existing structures or personal commitment. Financial or status implications of the program for self and colleagues may also be reflected.
SELF	1 INFORMATIONAL	A general awareness of the innovation and interest in learning more detail about it is indicated. The person seems to be unworried about himself/herself in relation to the innovation. She/he is interested in substantive aspects of the innovation in a selfless manner such as general characteristics, effects, and requirements for use.
SELF	0 AWARENESS	Little concern about or involvement with the innovation is indicated.

*Original concept from G. E. Hall, R. C. Wallace, Jr., & W. A. Dossett, A Developmental Conceptualization of the Adoption Process within Educational Institutions (Austin, Tex.: Research and Development Center for Teacher Education, The University of Texas, 1973).

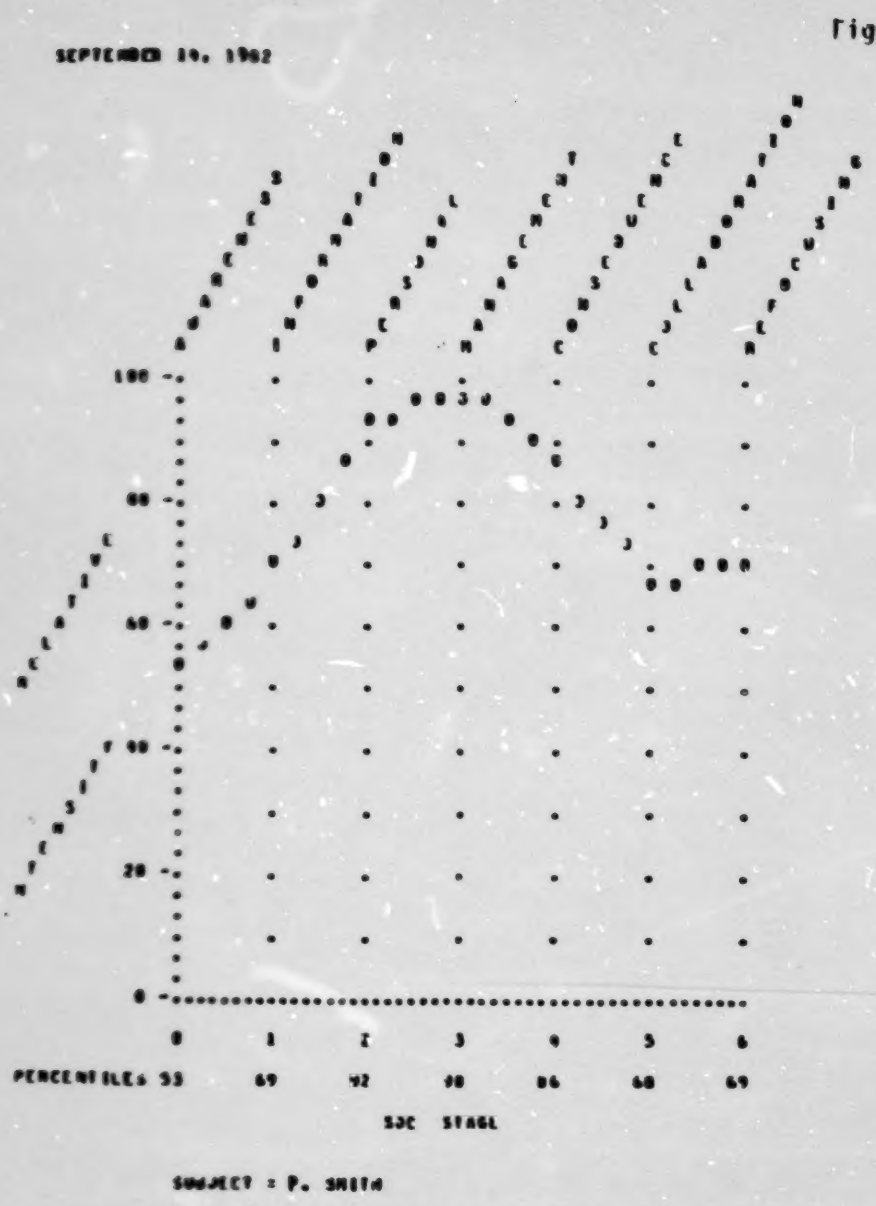
particularly useful in preparation for interventions such as staff meetings and workshops (Hall and Loucks, 1978).

For a more rigorous assessment of the concerns dynamic the Stages of Concern Questionnaire has been developed (Hall, George and Rutherford, 1979). This is a psychometrically rigorous questionnaire that can be used to assess concerns in regard to any educational process or product innovation. In the SoC Questionnaire there are 35 items to which individuals respond using a 7 point Likert scale. This questionnaire can then be scored and a "concerns profile" can be developed for individual and group interpretation. With the SoC Questionnaire it is possible to identify the Stages of Concerns that are most intense and also those that are the least intense. A skilled interpreter of SoC profiles can tell much about how a particular change effort is developing and about the perceptions and reactions that teachers and others have about it. A sample of the SoC Questionnaire Profile is included as Figure 3.

Arousal and Resolution of Concerns

In theory, Stages of Concern represent a developmental progression of the intensity of concerns of teachers and others as they move through a school improvment process. The hypothetical wave motion of intensity of concerns is illustrated in Figure 4. Initally Stages 0 Awareness, 1 Informational, and 2 Personal will be more intense. As implemention begins then Stage 3 Management concerns become intense and the Personal and Informational concerns begin to drop in intensity. Ultimately the earlier Stages of Concerns will become low in intensity and some combination of "impact" concerns (Stages 4 Consequence, 5 Collaboration, and 6 Refocusing) will become more intense. This hypothesized progres-

Figure 3



Interpretation of SoC Questionnaire profiles is reasonably straightforward. The overall profile is viewed by noting which stages are higher and lower. In this example, Personal, Management and Consequence concerns are quite intense. Informational, Collaboration and Refocusing concerns are relatively low in intensity. The most intense concerns are self concerns about mastering the new approach and management concerns about logistics, time and tasks. Almost as high are concerns about how the person's use of the innovation is affecting students.

Technical information about the SoC Questionnaire and interpretation procedures are covered in "Measuring Stages of Concern About the Innovation: A Manual for Use of the SoC Questionnaire," (Hall, George, & Rutherford, 1979).

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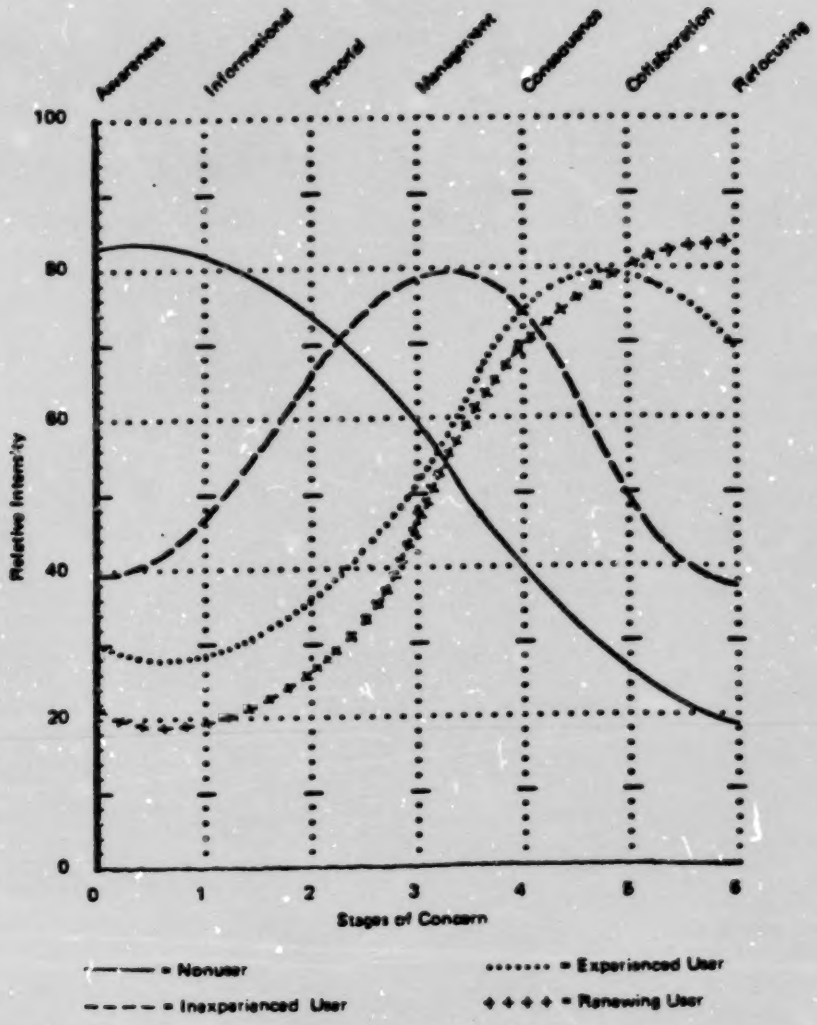
Figure 4

Hypothesized Development of Stages of Concern



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sion in intensity of concerns has been documented in several studies, however this progression does not necessarily happen in all instances. Clearly, the resolution of earlier concerns depends upon the characteristics and qualities of the innovation, the skill of the change facilitators, the amount of time that the implementation effort has been underway, and other contextual factors that may influence the change process.

Levels of Use of the Innovation

The Stages of Concern dimension focuses on the feelings and perceptions that teachers have about a particular improvement effort. It does not tell the interpreter very much about what the person is actually doing. The second diagnostic dimension of the CBAM model, Levels of Use of the Innovation (LoU), addresses this.

Consonant with the assumption that change is a process not an event is the understanding that a person is not one day a non user of an innovation and in the next instance a highly sophisticated user. The user of an innovation develops skills across different "levels" of use of the innovation.

In this second diagnostic concept eight different Levels of Use have been identified and described. These are illustrated in Figure 5. There are three non use levels, 0 Non Use, I Orientation and II Preparation, and five use levels, LoU III, IVA, IVB, V and VI. Each of these Levels of Use has been operationally defined and behavioral indicators have been specified to help a change facilitator or a researcher to identify and differentiate between the levels.

Assessing Levels of Use

The change facilitator can estimate Levels of Use through a "one legged" conference similar to that used for Stages of Concern. For research purposes a specially developed focused interview procedure is used (Loucks, Newlove & Hall, 1976). This takes the form of a 15 to 25 minute interview which the interviewee perceives as a conversation about what he or she is doing. The trained LoU interviewer is able to use a branching format based on the operational definitions of Levels of Use and follow-up probes to identify particular behaviors in which the interviewee engages that are indicative of a particular Level of Use.

The Levels of Use dimension becomes a particularly useful tool for planning since it is possible to predict to some degree how the Levels of Use will change across time. With this knowledge staff development and other intervention and resource needs can be anticipated. For example 60 to 70% of the first time users of an innovation will likely be at a level III Mechanical Use (Hall and Loucks, 1977). This is a time when there is a short term focus to the user's planning, a rather disjointed and inefficient use of materials, and perhaps constant referral to the users manuals. At this time the assistance that is needed should take the form of "how to do it" workshops and other kinds of consultation that can help resolve inefficiencies.

As will be illustrated in the JeffCo and Palm Beach case studies monitoring Levels of Use at regular intervals makes it possible to chart the progress of a change effort and to then make mid course adjustments. Thus, the Levels of Use becomes another important diagnostic and monitoring tool for change facilitators, researchers and evaluators.

Figure 5

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LEVELS OF USE OF THE INNOVATION

LEVELS OF USE	DEFINITION OF USE
0 NONUSE	STATE IN WHICH THE USER HAS LITTLE OR NO KNOWLEDGE OF THE INNOVATION, NO INVOLVEMENT WITH THE INNOVATION, AND IS DOING NOTHING TOWARD BECOMING INVOLVED.
Decision Point A	Takes action to learn more detailed information about the innovation.
I ORIENTATION	STATE IN WHICH THE USER HAS RECENTLY ACQUIRED OR IS ACQUIRING INFORMATION ABOUT THE INNOVATION AND/OR HAS RECENTLY EXPLORED OR IS EXPLORING ITS VALUE ORIENTATION AND ITS DEMANDS UPON USER AND USER SYSTEM.
Decision Point B	Makes a decision to use the innovation by establishing a time to begin.
II PREPARATION	STATE IN WHICH THE USER IS PREPARING FOR FIRST USE OF THE INNOVATION.
Decision Point C	Changes, if any, and use are dominated by user needs.
III MECHANICAL USE	STATE IN WHICH THE USER FOCUSES MOST EFFORT ON THE SHORT-TERM, DAY-TO-DAY USE OF THE INNOVATION WITH LITTLE TIME FOR REFLECTION. CHANGES IN USE ARE MADE MORE TO MEET USER NEEDS THAN CLIENT NEEDS. THE USER IS PRIMARILY ENGAGED IN A STEPWISE ATTEMPT TO MASTER THE TASKS REQUIRED TO USE THE INNOVATION, OFTEN RESULTING IN DISJOINTED AND SUPERFICIAL USE.
Decision Point D-1	A routine pattern of use is established.
IVA ROUTINE	USE OF THE INNOVATION IS STABILIZED. FEW, IF ANY, CHANGES ARE BEING MADE IN ONGOING USE. LITTLE PREPARATION OR THOUGHT IS BEING GIVEN TO IMPROVING INNOVATION USE OR ITS CONSEQUENCES.
Decision Point D-2	Changes use of the innovation based on formal or informal evaluation in order to increase client outcomes.
IVB REFINEMENT	STATE IN WHICH THE USER VARIES THE USE OF THE INNOVATION TO INCREASE THE IMPACT ON CLIENTS WITHIN THE IMMEDIATE SPHERE OF INFLUENCE. VARIATIONS ARE BASED ON KNOWLEDGE OF BOTH SHORT- AND LONG-TERM CONSEQUENCES FOR CLIENTS.
Decision Point E	Initiates changes in use of innovation based on input of and in coordination with what colleagues are doing.
V INTEGRATION	STATE IN WHICH THE USER IS COMBINING OWN EFFORTS TO USE THE INNOVATION WITH RELATED ACTIVITIES OF COLLEAGUES TO ACHIEVE A COLLECTIVE IMPACT ON CLIENTS WITHIN THEIR COMMON SPHERE OF INFLUENCE.
Decision Point F	Begins exploring alternatives to or major modifications of the innovation presently in use.
VI RENEWAL	STATE IN WHICH THE USER REEVALUATES THE QUALITY OF USE OF THE INNOVATION, SEEKS MAJOR MODIFICATIONS OF OR ALTERNATIVES TO PRESENT INNOVATION TO ACHIEVE INCREASED IMPACT ON CLIENTS, EXAMINES NEW DEVELOPMENTS IN THE FIELD, AND EXPLORES NEW GOALS FOR SELF AND THE SYSTEM.

From: The LoU Chart. Austin: Research and Development Center for Teacher Education, The University of Texas, 1975.

Assessing Levels of Use

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As will be illustrated in the JeffCo and Palm Beach case studies monitoring Levels of Use at regular intervals makes it possible to chart the progress of a change effort and to then make mid course adjustments. Thus, the Levels of Use becomes another important diagnostic and monitoring tool for change facilitators, researchers and evaluators.

Innovation Configurations

The third diagnostic dimension of the CBAM Model focuses on describing in operational ways the innovation as it is implemented by different users. As is frequently recognized different users adapt innovations in different ways (Berman & McLaughlin, 1978; Blakely, 1982). This results in different "configurations" of the innovation (Hall and Loucks, 1981). Frequently many different operational forms of an innovation can be found within the same school. In some instances the developers model or vision of the innovation is quite different from the configurations that are found in classrooms. Thus, the third diagnostic tool for change facilitators, researchers and evaluators makes it possible to systematically describe the configuration of an innovation as it is implemented by different users.

To do this a special procedure has been developed to describe the operational form of an innovation (Heck, Stieglebauer, Hall and Loucks, 1981). This procedure entails the reviewing of all the materials and descriptions that are available about the innovation, then meeting with the various developers and observing classrooms where the innovation is in use. Out of these steps it is possible to identify the components that make up a particular innovation. These components can then be arranged in a Configuration Component Checklist which can be completed by teachers, administrators, staff developers or others who are interested in describing and differentiating the different configurations of an innovation that occur in different classrooms. A sample of a Configuration Component Checklist is included as Figure 6.

A developer, as referred to above, is an individual or group of individuals that "develop" an innovation. The developers may be from an

Figure 6 Sample Configuration Component Checklist

Component I: Objectives				
(1) Teaches Resource Guide objectives in their sequence	(2) Teaches text objectives	(3) Teaches other objectives		
Component II: Instructional Resources				
(1) Primarily uses activity kits	(2) Primarily uses teacher generated materials	(3) Primarily other commercial materials	(4) Primarily uses text	
Component III: Testing				
(1) Primarily mastery test at recommended time	(2) Primarily uses textbook tests	(3) Primarily teacher made test	(4) Primarily teacher observation/ judgement	
Component IV: Grouping				
(1) Individualized	(2) 3 or more small frequently changing groups	(3) 3 or more small stable seldom changing groups	(4) 2 groups at generally same objectives	(5) Whole Class at generally same objective
Component V: Use of Test Results				
(1) Each student's instruction is individualized on basis of test results	(2) Group(s) change; students are reassigned frequently	(3) Group(s) remain intact; students receive extra help as needed	(4) Group(s) remain intact any review is done by group	
Component VI: Record Keeping				
(1) Class profile displayed and current information recorded	(2) Class profile displayed, but not current	(3) Class profile not on display		

outside agency, such as a national curriculum project or publishing company. Developers can also be teachers and others from a particular school. In the Innovation Configuration work no assumptions are made about who the developer is and where they are "located." It is important that the developers describe their innovation in operational terms. If the "developers" are the entire staff of a school then the staff of the school should be the ones to develop the Configuration Component Checklist. If the developers are publishers, then they should be consulted. Without some indications about what the innovation is supposed to be like in operation, it is very difficult for teachers and others to know what to do or how how much freedom they have to vary their innovation use.

A related discussion point has to do with the issue of fidelity of implementation. In developing a Configuration Component Checklist, it is not necessary to build in a fidelity perspective. But the process does force the participants in a change effort to consider to what degree fidelity is important to them. Their decisions can be reflected on the Components Checklist. This information then becomes available to all participants. In this way when fidelity is important teachers can be given clear expectations about which configurations of an innovation are "acceptable" and which are "unacceptable."

The Innovation Configuration concepts were applied in the two case studies to be described in the next sections of this paper. In the JeffCo case a fairly clear, consistent and strongly held statement about acceptable practices was a part of the implementation effort from the very beginning. In the Palm Beach case the criterion for minimum acceptable practice was less ambitious and tended to evolve with the

implementation process. These two different perspectives on fidelity had some important consequences for implementation success in the two districts. Some of these issues are discussed in the summary section of this paper.

Interventions

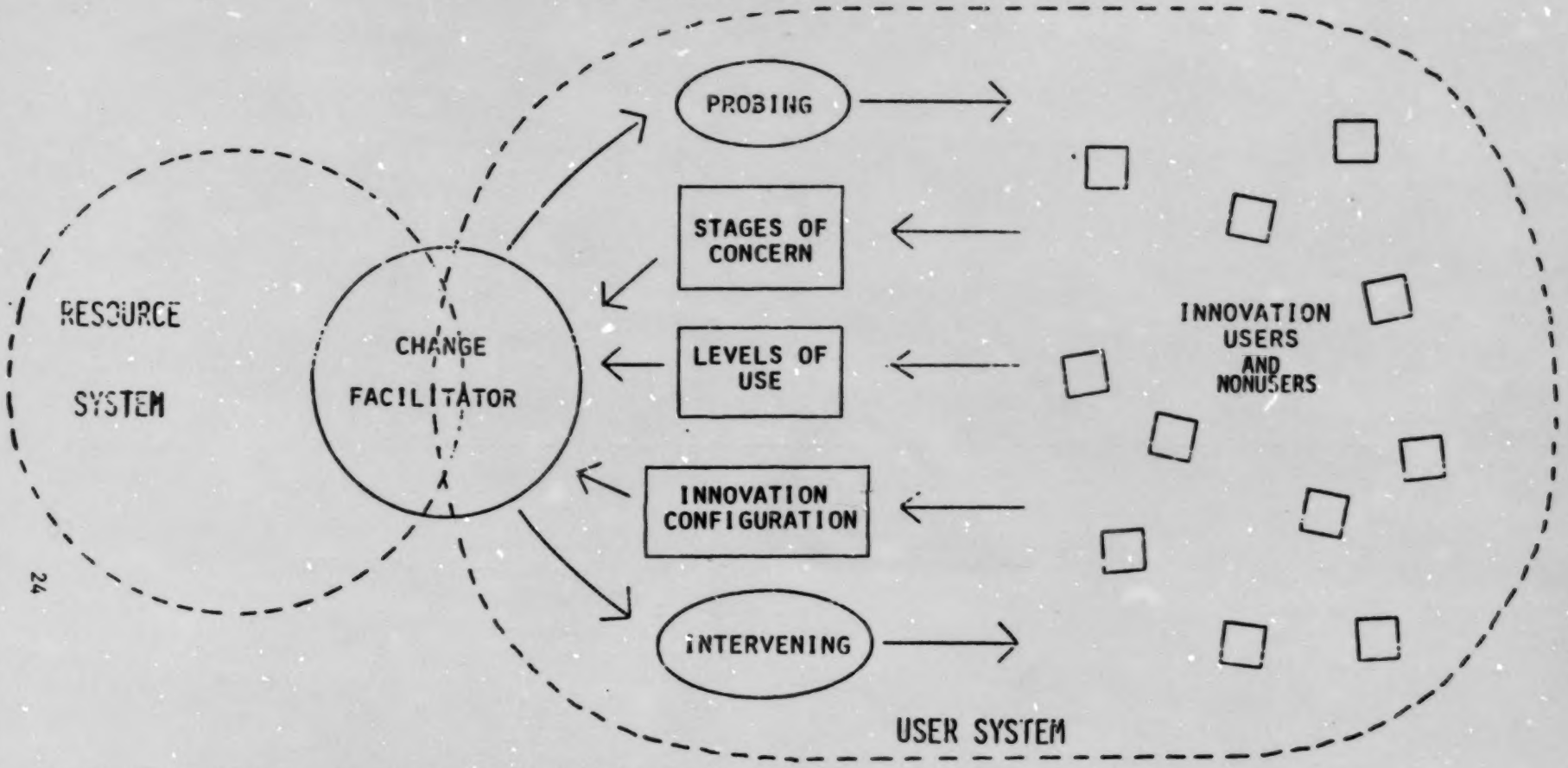
A brief mention needs to be made here of the concept of interventions. Another part of the Texas research has focused on developing an Intervention Taxonomy (Hall, Zigarmi and Hord, 1979; Hall and Hord, 1982) and procedures for analyzing and labeling the different kinds of interventions that occur during a change effort. In general any action or event that influences use of the innovation is considered an intervention. Examples of interventions include sending memos, telephone calls, conversations in the hallway, workshops, and policy decisions.

More recent work at the Texas R&D Center is focused on documenting the interventions that various change facilitators such as principals make as an implementation effort unfolds (Hord, Hall, Zigarmi, 1980). Work is also focusing on developing training resources (Hord, Thurber, Hall, 1981; Hord and Thurber, 1982) that can be used in helping school leaders become more aware of the kinds of interventions that they make and the effects that these various interventions have.

This work will not be described in further detail in this paper, however the concept of interventions is one that will play a part in the cases that are described. Different interventions were made at different times depending on the Stages of Concern, Levels of Use, and the Configurations of the Innovation that were being implemented.

Figure 7

THE CONCERNS-BASED ADOPTION MODEL



Hall, G. E. & Loucks, S. F. Innovation configurations: Analyzing the adaptations of innovations. Paper presented at the annual meeting of the American Educational Research Association, Toronto, March, 1978.

Hall, G. E., Zigarmi, P., & Hord, S. M. A taxonomy of interventions: The prototype and initial testing. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, April, 1979.

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Interventions in a Concerns Based model are provided to address the needs and practices of the non users and users of innovations. That is, interventions are grounded in the participants school improvement experiences as they are occurring. One way to depict this relationship is illustrated in Figure 7.

The School Improvement Process and CBAM

At this point a brief return to the organizing framework that was presented in Figure 1 may be helpful. In a school improvement effort there are three different phases: School Review, Solution Selection/Development and Solution Implementation. The three diagnostic dimensions of the CBAM model, Stages of Concern, Levels of Use and Innovation Configurations are generic concepts. The concepts could be applied to any kind of innovation and can be used with "non users" as well as users.

Thus, the CBAM diagnostic dimensions could be used with individuals in a faculty as they engage in the "innovation" of School Review, or Solution Selection/Development or Solution Implementation. Teachers and others will have concerns about and levels of use of particular configurations of each of these innovations in which they are involved. The JeffCo and Palm Beach efforts used the CBAM diagnostic dimensions in the Solution Implementation phase. By having two cases that report on the same phase of the school improvement process it is hoped that the reader will be able to more easily draw comparisons and identify the similarities and implications that came out of these experiences.

Case I: SCHOOL IMPROVEMENT IN JEFFERSON COUNTY, COLORADO

This part of the paper describes an extensive school improvement project that included 80 elementary schools, that began in 1974 and continues to this day. In addition to involving a major collaborative relationship between the University of Texas and the Jefferson County Public Schools, the project also involved the support of a third institution, the Math and Science Teaching Center at the University of Wyoming. The improvement project began with a needs assessment conducted in 1973 and progressed through the development of a revised elementary science program for grades 3 through 6 that was introduced to all elementary schools in the district. The improvement effort was supported through an extensively planned staff development program that was monitored using the Concerns Based Adoption Model instruments, Stages of Concern Questionnaire and Levels of Use interviews. Following the implementation of the revised program in all schools, the degree to which the program had been successfully implemented was monitored in randomly selected schools using a locally developed configuration checklist. This final monitoring effort proved so successful that the entire school district adopted the model for implementation developed by the Science Department.

School Review and Curriculum Development in Jefferson County Public Schools (JeffCo)

JeffCo was created in 1951 by the consolidation of 39 separate school districts and the establishment of a district-wide uniform curriculum policy in order to unify the various communities and school differences. Today curriculum continues to be developed through a well defined process that was formalized in 1974 (Jefferson County Public Schools, 1974). This process

includes a school review and needs assessment, the development of objectives, curriculum writing, pilot testing, field testing and district-wide implementation, support and maintenance.

There are several groups that provide advisory recommendations to the curriculum developers throughout the process, and ultimately advise the Board of Education whether the program should be adopted or not. These groups include lay/professional curriculum councils, principals and district school improvement project council, and the superintendent's cabinet. When the curriculum development process is completed, assurances have been made that all of these groups support the curriculum modification and that budgetary support and personnel time allocations have been made, both for the development and the initial implementation activities. In Jefferson County individual school improvement, in the area of curriculum modification, takes place within the context of a district wide umbrella. That support, which is both technical and financial, makes significant and extensive change or improvement possible that would generally be impossible for an individual school operating alone.

The entire process begins with a needs assessment which can be conducted, or presented by any number of groups, including program coordinators, parents, individual teachers, principals, etc. Once the needs assessment is carefully documented it is presented to the advisory groups listed above. If concensus is reached by these groups, the job of developing the objectives and outline for the curriculum is assigned to a curriculum coordinator, who will pull together a committee of teachers, administrators, and often parents, to develop objectives of the new course or unit.

The objectives are reviewed by the recommending groups. A writing team will then be assembled to create a pilot version of the unit or course. The

material is piloted in a few selected schools by teachers (often some of the writers) who are very familiar with it. These highly qualified pilot teachers allow the curriculum developer to hold the quality and experience of teachers constant and examine the variable of the materials. The feedback collected from the pilot teachers is then presented to the above groups and, if permission is granted, a field test version of the unit is developed. The sample of field test teachers will be a much more broadly selected group, usually randomly selected from a variety of teaching situations throughout the district. The purpose of the field test is to determine the management and implementation problems that typical teachers encounter with new materials and design the inservice and other implementation activities so that the curriculum will be used by the rest of the teachers in the district.

The last round of approval must be obtained from the groups noted above and then the plan and curriculum are presented to the Board of Education for their approval. By this time, teachers and administrators across the entire district are well aware of the impending change even though they have not all been directly involved with the change effort. With this summary as background, most of the balance of this section of the paper will describe the implementation activities used to help all teachers to incorporate the revised science program into their teaching.

The Innovation - Revised Elementary Science Program, Grades 3-6

The elementary science program in use prior to the revisions had been implemented in 1969. By 1973 a lack of attention to science, due largly to a major emphasis on teaching the basic skills, had created several problems that were identified in the 1973 review of the schools and needs assessment. The needs that were identified at that time were:

1. New district goals and student outcome statements had been adopted to describe what the "JeffCo community thinks a graduate of our schools should look like, act like, and be prepared to do when he leaves high school," (Jefferson County Public Schools, 1974). The curriculum needed to be modified to meet these goals.

2. The orginal program was weak in the area of life science. Teacher observation and research (Whitla, 1973, BSCS, 1975) indicated that students were very interested in themselves and their physical, biological and social environment. With this knowledge the decision was made to strengthen the health and environment education areas of the curriculum.

3. The "back to basics" movement, with its strong emphasis on reading, mathematics and language arts, reduced the time and effort given to science in many schools. In order to promote better learning and maximum instructional time, specific application and reinforcement of identified basic skill objectives would be incorporated into science activities.

4. A more precise definition of expectations was needed to help teachers better understand open-ended science activities. This would be a set of performance objectives which clearly defined expectations of students, as well as processes of measuring and assessing student performance.

With these needs identified, the formal district curriculum development process was initiated. By 1975 lists of objectives and assessments, as well as references to basic skill objectives were produced for each science teaching unit. In addition a carefully designed Teachers Guide was developed for each grade level. This guide consists of a notebook that acts as a "roadmap" through the commerical science curriculum materials that are used and outlines the activities that teachers are to use. These guides also show where teachers may supplement with outdoor activities, identify what media will reinforce concepts, suggest how to evaluate students and include a complete set of worksheets. The total program, grades 3-6, is delineated in four content strands: health, physical science, environmental sciences, and earth science/astronomy. The activities place an emphasis on hands on experiences, inquiry learning and cooperative student work.

Assumption #1: Change is a Process--Not an Event

The JeffCo Science Department had scheduled a fairly typical three-day inservice activity for teachers very near the beginning of the school year. After considering the CBAM model ideas, that plan was changed to allow more time between sessions for teachers to use the units in their own classrooms. Since the inservice plan for any one school would now require almost a year to complete, the 80 elementary schools in the district were divided into three groups or phases. Phase II and Phase III schools began their inservice program six months and one year, respectively, after Phase I.

Other activities were arranged to extend the time in which teachers would have to adjust to change. A series of two pre-inservice sessions were scheduled approximately two months before the inservice sessions were to begin, to introduce teachers to the new program. Approximately three months prior to that, all principals of the schools involved participated in a one-half day orientation to the revised program. Ways in which they could inform teachers of the change and support the change process itself were outlined. Then after the final inservice sessions were completed, contact with teachers was maintained through a planned series of "comfort and caring" visitations by two members of the Science Department to the classrooms involved. The "change process" was given two years instead of two weeks.

Assumption #2: Change is a Personal Experience

The inservice plan called for paying close attention to the individual teachers who bear the ultimate responsbility in implementing the new program. Principals were given suggestions for personally supporting their teachers through scheduling procedures, provision of equipment and supplies and simply providing time to discuss the innovation.

The Implementation: A Collaborative Effort

When the collaboration between JeffCo and the Texas R&D Center began in the spring of 1976 the development process of the revised program had been completed and had been approved for implementation. The science program developers and the staff development office had completed the initial plans for an extensive implementation inservice program to be conducted over the next two years.

As the R&D researchers and the JeffCo practitioners began their joint planning effort, the concept of Levels of Use served as an important goal-setting function for the JeffCo implementation. The goal established was that each teacher would reach at least a Routine (IVA) Level of Use. This decision influenced the target teacher population, the kind of support provided and the structure of inservice for teachers.

In addition to this Level of Use goal, it was determined beforehand that the implementation effort should result in low Informational, Personal and Management concerns (Stages 1-3) by the end of the implementation effort. It was hoped that resolving these would allow concerns about students or impact concerns (Stage 4) to dominate science instruction.

To carry out the implementation the first activity was to plan with and train 23 carefully selected elementary teachers who would serve as inservice leaders (An additional 11 leaders were prepared during the second summer). Their training session took place at the University of Wyoming Math and Science Teaching Center and lasted for a full week. With the assistance and input of the R&D staff and the University of Wyoming staff, the JeffCo inservice leader teachers used the CBAM model to rework the inservice and implementation plans. In developing these plans the following assumptions of the CBAM model were used as a guide.

The pre-inservice sessions were held in each of the local schools. The sessions were informal and included a small number of teachers so individual questions and concerns could be attended to readily.

The day long inservice sessions were designed so that teachers had choices of activities depending upon the amount of science teaching experience and confidence they had with elementary science. Teacher-to-leader ratio was kept small in the inservice sessions, using trained, enthusiastic classroom teachers who as leaders, had already taught the new curriculum. These leaders could often anticipate, and more readily identify with, the problems and questions of the classroom teachers than could the program designers.

Between each of the day-long inservice sessions two of the science staff members began the comfort and caring activities by consulting with and helping individual teachers deal with problems they were encountering with the new program.

Assumption #3: Change Involves Growth in Feelings and Skills

As mentioned above, individuals go through stages in their concerns about an innovation. The pattern is to some degree predictable and implementation activities can be planned in general to match the development of the individuals involved. Because the JeffCo science implementation plan was designed with the Stages of Concern in mind, it is useful to review the chronology of the implementation plan according to the stages.

Stages 0 and 1: Awareness and Informational Concerns. Teachers and principals were informed by a memo from the Science Department in early spring that they would be involved in pre-inservice sessions late the next fall and inservice sessions starting in January the following year. They were told which units could be replaced or revised, what equipment would be provided to each school and given a recommended schedule by which they could phase out the

old guide and teach the units in the new guide to correspond to the inservice schedule. After the principals' orientation in August, the teachers were informed again by their principal, when they returned to school in September, of the pre-inservice dates and inservice schedule.

Stages 1 and 2: Informational and Personal Concerns. The pre-inservice was specifically designed to introduce teachers to the reasons for the revision, to a few details about the guide and to inform them of the dates, location and organization of the total inservice plan. A slide tape show was used to orient them to the new program, guides were distributed to all teachers and a brief activity was used to introduce its contents and format. A small, informal group setting allowed ample time for questions and answers about the entire program. In addition, teachers were reminded of the recommended teaching schedule that would be most useful to them so that they could coordinate their teaching of the old program and make the transition to the new with the advent of the inservice sessions.

At the inservice sessions Personal concerns were addressed by keeping group sizes small so that discussion could occur and by requesting written feedback at the end of each session. As mentioned earlier, Personal concerns were attended to throughout the entire implementation process by means of comfort and caring sessions in the local schools.

Stage 3: Management Concerns. The first inservice session paid particular attention to Management concerns. In an early part of the session specific classroom and equipment mangement techniques were explained and demonstrated to the teachers. The major portion of the day was spent by teachers actually doing the activities in the science units with a strong emphasis on "how to do it" by the leaders. A portion of the inservice day was devoted to self-paced instructional modules. One of the modules from which

teachers could select was designed to help with mangement techniques for caring for live animals in the classroom while another was devoted to procedures for conducting outdoor activities. Trained teachers as inservice leaders meant that answers to many questions were available from people with previous classroom experience in that unit. In the next two inservice sessions mangement help was continued but to a somewhat lesser degree as the emphasis shifted toward responses to concerns at higher levels.

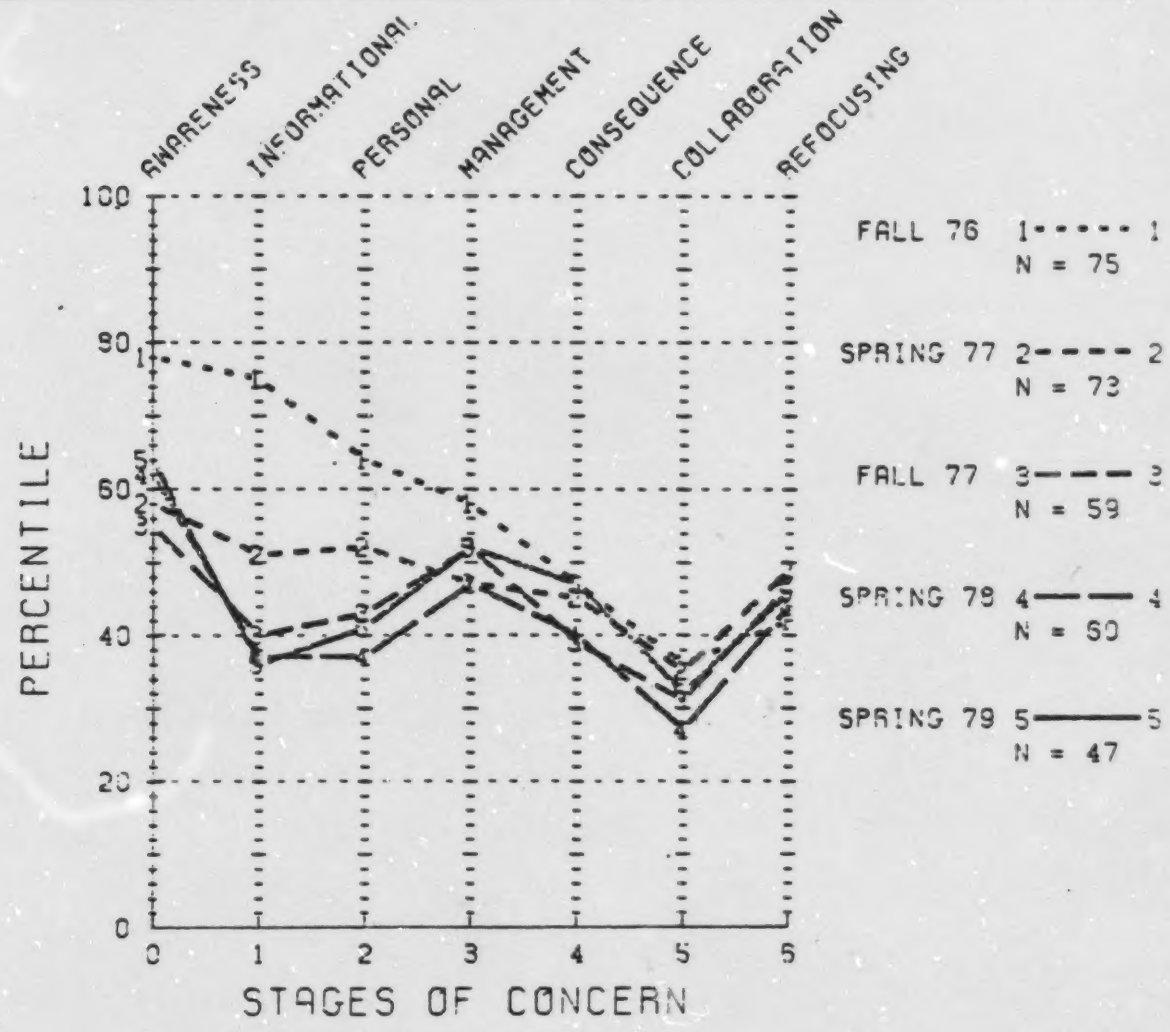
Stage 4: Consequence Concerns. As expected, the teachers at the inservice sessions varied considerably in their experience, confidence and Stage of Concern. To deal with these individual differences teachers were given a chance to self-select the amount of time they spent actually doing a unit, giving them more time to deal with Management concerns if they wished. They were also allowed a choice during the module sessions. If their concerns had progressed to a Consequence stage, modules on Piaget, questioning techniques such as "wait time," and the use or misuse of science vocabulary were available.

Monitoring the Implementation

During the course of the implementation effort three methodologies were used to assess its effects. Stage of Concern and Levels of Use data were collected five times during the three-year implementation. The third methodology, developed from the concept of Innovation Configuration by the Science Department and the district's evaluators, identified program specific components and used these components as the basis for measuring the extent of implementation in another set of randomly selected schools. A sample of 19 schools was selected to represent different phases of implementation. All

Figure 8

STAGES OF CONCERN AND LEVELS OF USE DATA FOR PHASE I SCHOOLS



LEVELS OF USE DISTRIBUTION

	0	I	II	III	IVA	IVB	V	VI	
FALL 76	5	9	83	1	1	0	0	0	N = 75
SPRING 77	0	4	9	53	24	7	1	1	N = 74
FALL 77	3	3	5	38	35	0	13	3	N = 63
SPRING 78	2	3	2	42	34	13	3	2	N = 62
SPRING 79	6	0	2	23	52	13	0	4	N = 52

PERCENT AT EACH LOU

teachers of grades 3 through 6 were included initially and these same teachers were followed through the final year.

How did the concerns of teachers about the revised science program change over time? Figure 8 presents concerns data for the teachers. The first measure of concern was collected approximately two months before any inservice activities. Notice the concerns were highest at the lower stages SoC 0, 1 and 2. This is typical of non-users. The next data were collected shortly after the second of the three inservice training days had been conducted and after teachers had been using the new program for approximately four months. Stages 0 through 3 have dropped in intensity with an increase in refocusing (SoC 6) concerns. This general trend with some slight increase in consequence concerns plus the lowering of mangement concerns continues through another year. The bottom of Figure 8 displays LoU data from all teachers from all 19 schools. Note that these teachers shifted predominantly from LoU II Preparation at the first data collection point to LoU III Mechanical use, after three or four months of using the new program. One year after the introduction of the program, mechanical users begin to shift to users at Routine and higher levels. A year later there are still a significant number of teachers at LoU III Mechanical use, but at the last data collection point two and one-half years after initial inservice, a majority are at Routine level, LoU IVA.

It is interesting to note that with all the contextual changes and competing demands on JeffCo teachers during the implementation years that approximately two-thirds of them remained at a Routine level of use and had resolved most of their lower stages of concern. Thus, three years after initiating the implementation effort, the goals of the facilitators had been achieved for most teachers.

Monitoring Implementation in Terms of Program Specific Components. The program developers/implementors welcomed Levels of Use assessment as useful in monitoring the early progress of the implementation effort. A teacher had to utilize the district's teachers guide and teach at least 80% of the science units to be considered a "user" of the new program. Since there could be many ways a teacher could implement the strategies found in the guide, the developers saw a need for an expanded definition of use to include other components that allowed developers, principals and teachers greater diagnostic power. This definition needed to be in terms unique and specific to the total science program. Twelve components of the elementary science program were identified and described in their ideal form. They clustered in three categories. These components and categories are described in Figure 9.

Instrumentation and Data Collection. Once the program components were defined, detailed descriptions of each were written in order to measure as objectively as possible the extent to which each component was being operationalized by the individual teacher. The behaviors were placed on a 5-point Likert scale: 1--outside the intended program; 2-3-- getting a good start; 4--well on the way; 5--best practices in operation.

Instruments and data recording sheets for use in monitoring the extent of implementation of the program as defined by the twelve components were developed by the district Department of Evaluation (Darnell, 1979). These included a focused teacher interview, a classroom observation checklist, a focused principal interview and a focused media specialist interview.

This assessment of implementation took place during the second year of implementation after the inservice program had been completed. A random sample of eleven large, middle-size and smaller schools was used. Two hundred

BEST COPY AVAILABLE

Figure 9

COMPONENTS OF THE SCIENCE PROGRAM

I. Program components over which district policy or procedure appear to have the major influence for implementation in the classroom:

1. The recommended percentage of teaching time during the day is devoted to science. An average of 15% of the student's day (10% for third grade) should be devoted to science.

2. Science is taught according to the district guide. During the school year the teacher teaches all units, all objectives of each unit and 90% of the activities.

3. Students' learning is assessed according to the district science guide. According to a review of each unit, the teacher uses the guide assessments with students 85% of the time.

4. Basic skills, as differentiated by the continuum in each curriculum area, are being integrated into the science program. The basic skills keyed in the guide are being introduced or stressed in their subject area time allotment while they are being reinforced during science instruction.

5. The outdoors is used as a classroom when recommended. Whenever outdoor activities are recommended as part of a unit, they are always included.

II. Program components over which the building principal and the teacher both have a major responsibility for influencing implementation in the building and classroom:

6. All materials, equipment and media are available. Appropriate commercial guides and the district guide are available for use. Enough materials are available for individual or small group usage. A storage system of logical sequence is established.

7. Principals have arranged for release of teachers for the total inservice training package and have allocated financial support to the program.

8. Long and short-range planning is evident. The year's schedule is written out and being implemented by the teacher or the team. This schedule reflects attention to seasonal demands, sharing of materials, and maximum utilization of space and personnel. Before each unit is taught, overall planning for that unit takes place.

III. Program components over which the teacher has the major influence for implementation in the classroom:

9. Class time in science is used efficiently and effectively (time on task). At least 75% of the class time is devoted to exploration, pupil interaction, recording data, discussions and listening to each other. An efficient management system for distribution and clean-up of materials is evident.

10. Teacher-student interaction facilitates the program. Using the students' language, the teacher shares with students the objectives of the units. Discussion techniques include: neutral rewarding, wait time, questions above recall level, maximized use of student-student discussion; and data sharing.

11. The classroom environment and arrangement facilitates student-student interaction in small groups. Furniture and materials are arranged in order to facilitate small group interaction. Student behaviors include sharing of materials, listening to each other, working together towards a group goal, and interacting with each other (cooperative learning). Students are task-oriented most of the time.

12. The instruction in the classroom follows the stages of the learning cycle in science: exploration, concept formation, concept application.

FIGURE 10

Sample Building Summary Sheet

	OUTSIDE INTENDED PROGRAM	GETTING A GOOD START	WELL ON THE WAY	BEST PRACTICES WORKING
	1------2-----3------4------5			
1. Time is devoted to science	*** **	*	**	*	**
2. Science is taught according to R-1 Guide	*** ***	*** **			
3. Assessment of pupil learning	*** ***	*** **			
4. Integration of basic skills	*	***** ****	*		
5. The outdoor classroom is used as recommended		*** **	*** *	**	
6. Recommended materials, equipment and media are available			*** **	*** *	**
7. Inservicing and financial arrangements have been made		*	*** **	*** **	
8. Long and short range planning		***	*** ***	**	
9. Use of class time	**	**	****	**	*
10. Teacher-Pupil interaction facilitates program	***	****	****		
11. Classroom environment facilitates program		***	***	***	**
12. Instruction is sequenced to facilitate the guided inquiry learning approach	**	**** *	****		

School Winter Elementary Teacher all 3, 4, 5, 6 teachers

R-1 Program Evaluation
Revised Elementary Science Program Evaluation 1/80

seventy-nine classroom observations were made of 92 teachers and 3,114 district students.

Each classroom was assessed on every component and data were summarized for each teacher across interviews and observations. A building summary was constructed. Figure 10 represents an example of a building summary sheet.

Because the components represented an operational definition of a well implemented elementary science program, it was assumed that the results of the monitoring of these components would be used by the principals to improve the program in their building when deficiencies were identified. However, when the data were presented to principals and they were encouraged to use it in a follow-up activity with their staffs, they expressed little interest in doing so. Four major reasons for the lack of follow-up seemed apparent:

1. The principals and teachers had little or no knowledge of the components or the specific behaviors for each component that were being used as the basis for the evaluation.

2. The schools had been chosen randomly; principals had not elected to participate in the program for the purpose of improving the implementation of the science program.

3. Principals had virtually no role in collecting, summarizing or reporting the data to their staffs.

4. Teachers were guaranteed anonymity; therefore, no data were linked to individual teachers. Since data were summaried for the total school only, it was not possible to consider individual teacher needs.

The conditions cited above had purposely been maintained by the Science and Evaluation Departments in order to collect "clean" data in an unobtrusive way. The purpose was to determine the extent to which the program had been implemented but not to affect the implementation in any way.

The second round of evaluation in 1979-80 in a second group of schools was based on a more purposeful effort to improve the implementation of the program, rather than evaluate the extent of implementation at any one given time. To do so the principals became a part of the process (Melle & Darnell,

1980). Thus, before school began in the fall of the 1979-80 school year, ten volunteer principals became involved in the monitoring process and attended a two-day workshop presented by the program developers. This workshop provided small group interactive practice in understanding 1) the nature of the elementary science program, grades 3-6, as defined by the components, 2) the facilitating strategies for principals use listed in the "Principal's Handbook" for implementing the program, and 3) the classroom observation and focused interview techniques used to obtain data.

Principals presented the components and the process of data gathering to be used to their respective staffs. With administrators, program developers and teachers all aware of the components and the process of monitoring, principals and program developers began collecting data shortly after school began.

The data from the second group of schools that were monitored revealed that the level of component implementation increased dramatically when principals were involved in the monitoring process from the beginning, when the component information was shared with staffs before the program was monitored, and when the summarized data and results were shared on a one-to-one basis with each teacher involved. This is evident in the higher ratings of the second group of schools on all components when compared to the ratings of the first group of schools. During the second monitoring effort, the role of program developer became one of support and as a source of expertise to the building administrator. They worked together with a mutual goal of aiding staff in understanding the components, implementing the program in terms of the components and collecting, summarizing and sharing individual and total staff data. Teachers, knowing the component goals, modified their teaching practices and demonstrated willingness to change behaviors when the

principals set goals. This process most certainly appeared to improve instruction.

Impact on District Policy

It is useful to examine the interplay between the entire school district improvement effort related to the elementary science program, and the activities for improving implementation at the local level just described. The original innovation was a revised elementary science program. The initial implementation effort was orchestrated across the district by the program developers and staff development personnel. Once the initial implementation was completed, local school initiative in cooperation with district level personnel provided further refinement and improvement in the use of the science program. Although a general scheme was provided, individual schools made the decision to participate and to a large extent determined how they went about it, and what improvement was needed in their school. It is an excellent example of a cooperative effort between local school personnel and district based technical staff.

The interaction and product went one step further when the Science Department presented to the Division of Instruction, and eventually the Board of Education, the process of improvement just described. After considerable study, work and revision, a district-wide policy for the development, implementation and maintenance of programs was approved by the Board of Education in the fall of 1980 (Jefferson County Public Schools, Policy IMB). By this action the school board sanctioned school improvement at the local level with support and encouragement from district based personnel.

Evaluating Student Achievement

In addition to the extensive monitoring of the degree of implementation by the use of SoC Questionnaire and LoU interviews and program configuration, the program developers developed a criterion reference test for all sixth grade students. Development of this test had been proposed by the developers at the time the original curriculum revision was approved, but it was argued that the use of such a test should not be initiated until after the implementation was well accomplished in the schools.

To develop such a test, parallel items were developed in two batteries. The first battery was a hands-on, interview type test that was administered on a one-on-one basis. The second battery consisted of a paper and pencil multiple choice item type test that matched the items in the first battery. Through the extensive help of the University of Colorado Bureau of Educational Field Services these two tests were statistically examined and only those paper and pencil test items were selected that proved to have a high correlation with the hands-on version. This test was administered in a field test version and finally developed for use for all students.

In examining the data from the test when used by all three phases of implementation almost three years after the first inservice program began, there was evidence that at least the better students in Phase I scored higher on the criterion reference test than those in the other two phases. (Pratt, Winters and George, 1980) The most straight forward interpretation of these results is that teachers with greater experience with the new science program were more effective with students of high ability. The conclusion rests on the assumption that Phase I teachers are implementing the program more fully than Phase II or Phase III teachers. It is true, from the earlier data, that Phase I teachers had higher Levels of Use at the time of the testing than

Phase II or Phase III teachers, (Loucks & Melle, 1980) that is, more years of experience in the use of the program by teachers leads to higher Levels of Use which in turn leads to higher achievement by their students.

Case II: PALM BEACH COUNTY, FLORIDA

SCHOOL IMPROVEMENT EFFORT

The school system of Palm Beach County, Florida serves 72,000 students. It is made up of 96 school centers: 59 elementary schools (primarily grades K-5 or 6), 17 middle and junior high schools, 14 senior high schools, and 3 special education centers including 3 vocational/technical school centers serving high school and adult clientele. There are over 8,000 employees in the system which includes approximately 4,500 teachers. The school district has had for several years a strong school-focused staff development program.

In 1978, the Palm Beach County Schools inaugurated and continues to be involved in a system-wide process designed to bring about school improvement. The outcomes of the process were expected to be increased student performance in four basic areas of learning:

- mathematics
- language arts (including reading and writing)
- social sciences
- natural and physical sciences

The school improvement effort centers around the development and implementation of an innovation known as the Palm Beach County Unified Curriculum. The Unified Curriculum is a district developed program with the following components: sequential instructional objectives, suggested instructional activities and materials; student mastery tests; individual student progress records; class profile record keeping charts; and other resource materials to be used as appropriate in the instructional process. The system-wide use of identical textbooks supports the instructional process. The Unified Curriculum program, which has as its aim the provision of a

consistent instructional program for all students was initiated to respond to two system-wide needs:

- poor pupil performance on cognitive test measures
- high rate of pupils transferring among schools because of family mobility.

Needs Assessment

The first problem addressed by the utilization of the Unified Curriculum was poor student performance. On the state-wide testing program (the Florida State Student Assessment Test which is administered at selected grade levels) the system-wide results were quite low. For example, in the area of mathematics, third grade students scored at or above the state-wide average on only 1 of the 14 standards assessed and fifth graders did not score at or above a single standard.

Second, the students of the Palm Beach County Schools are an extremely mobile group. Approximately 40% of them transfer from one school center to another (other than vertical articulation) within their careers as K-12 pupils. Prior to introduction of the Unified Curriculum, students transferring from one school to another within the district were most likely to find themselves in a completely different set of text materials in a vastly changed instructional program. This was usually the case though pupils were transferring to the same subject within the same grade level. The disruption to student progress in such a context is obvious.

Improvement Effort: The Game Plan

For the major reasons cited, the School Board of Palm Beach County and the decision-making administrators of the system set an important course for school improvement focused on instructional programs. The curriculum area of

elementary mathematics was given the first attention for improvement. This effort which is now entering its fourth year evolved along several interrelated lines:

Program

Development and revision of curriculum objectives and materials

Administrative personnel

Preparation of school center and other administrators and facilitators to support the change effort

... training in how to deal with the change process

... training in the content of the curriculum materials

Instructional personnel

Development of teachers' skills to utilize the new program and materials

... training through centralized and school focused efforts

... training through school-based efforts

The New Program

The process for development of the Unified Curriculum involved all levels of local school district personnel. Teams of teachers developed listings of objectives for each elementary grade level, and for secondary level mathematics courses. Writing teams comprised of teachers organized and revised the objectives. These objectives were then sent to all teachers who were asked to examine the objectives in terms of their adequacy, regarding appropriateness for grade level, relationship to subject, and degree of difficulty. Teachers' remarks about the objectives were then collected. The teacher writing teams, under the direction of a central curriculum development specialist, utilized the objectives as revised by teachers in the field to initiate the development of Resource Guides.

The Resource Guides contain the objectives arranged in an appropriate sequence and, also, suggested instructional activities for classroom use. The writing teams developed student Mastery Tests which test each objective, and various individual student and group record keeping forms. The materials including all necessary graphics were produced and printed locally. As the materials were being developed they were reviewed formatively by selected groups of teachers. As the teachers tested the materials they returned their opinions on forms provided. Feedback meetings involving teachers and administrators were also conducted.

Personnel: Implementation/Facilitation Training

An equally significant effort was devoted to the implementation process, for without successful implementation the expenditure of financial and human resources in the development effort would be of no avail. Concurrent with the initiation of the development process for the Unified Curriculum an effort was undertaken by instructional division personnel to acquire information that would assist and support the implementation of the materials.

As a result, central office personnel learned of research, relative to understanding individual responses during the change process, being conducted by the Research and Development Center for Teacher Education at The University of Texas, Austin. More specifically, local interest centered on how knowledge of and training in two of the CBAM (Concerns-Based Adoption Model) diagnostic dimensions, the Stages of Concern (SoC) and Levels of Use (LoU) concepts, could assist administrators in implementing an educational innovation. The concerns-based approach to curriculum implementation being utilized by science coordinators (and trained teachers who served as inservice leaders) at Jefferson County, Colorado, was studied in detail, including on-site visits by teams of Palm Beach administrators and curriculum developers. Noting the

success of the Jefferson County program, the Palm Beach District elected to utilize a concerns-based approach to implementing the Unified Curriculum.

Central Administrators. As the curriculum materials neared their publication, the first phase of the implementation inservice for facilitation began. Central and other non-school administrators (external facilitators, such as sub-district area math specialists) were oriented to their role in the change process. Relevant findings from the Rand Change Agent Study (Berman & McLaughlin, 1978) and the CBAM work were incorporated into the training provided to administrators, which focused on the various factors deemed important to successful program implementation. External facilitators involved in the training for district administrators included several Florida Atlantic University professors, one of whom provided metric workshops to some schools and another who helped other schools develop supplemental materials. Following the initial sessions for the central administrators, the inservice program for the building level administrators began.

Training for principals. It is a commonly held view that the principal (headmaster) is the key to the implementation effort. Therefore, the training of the principal was considered to be critical for the Palm Beach school improvement goals. The CBAM concepts and skills, a major focus in the training, were considered to be as important for the principal as was the content of the Resource Guides. The design of the training of the principals was conducted using a concerns-based approach (Hord, Thurber, Hall, 1980; Hord & Thurber, 1982). During the first phase, the training focus was on Stages of Concern and how to use this concept to help teachers. During the first session, all principals were taught how to identify Stages of Concern using the three methods: open-ended statements, the Stages of Concern questionnaire, and informal interviews. Principals were also given practice in

interpreting respondents' data and how to utilize data acquired in school-based settings.

After several months, volunteer principals were involved in a second workshop. During this time there was a review of the SoC concept, and use of a case study for extension of data intepretation skills. Principals were asked to collect SoC data from their own faculties during the next several months. Then in the next workshop they refined their understandings of the concept, analyzed their own data and developed specific interventions based upon the concerns data, in order to facilitate implementation of the Unified Curriculum with their faculties.

The following year, shortly before the beginning of school, all principals were involved in a workshop where SoC concepts were reviewed and participants were given practice in interpreting SoC data. A second part of the training was devoted to introducing the concept of Innovation Configuration of the Unified Curriculum. The following month, volunteer principals were given further practice in SoC data collection and learned how to formally develop a framework for interventions to be undertaken in order to facilitate the implementation of the Unified Curriculum. After an interval of several months, principals were asked to design a plan of interventions based upon training in Levels of Use and data collected from their faculties. As was mentioned above the training for principals throughout the two years was designed and delivered in a concerns-based way. Workshop leaders provided feedback and support to the principals in substantive ways, thus ameliorating their personal and management concerns about their role as facilitators/ instructional leaders.

Instructional Personnel: Staff Development for Teachers

During the period when principals were receiving training for facilitating, principals and teachers were also receiving inservice on the content of the Unified Curriculum. The first sessions for principals and teachers were designed to provide information about the new program (SoC 1 Informational Concerns) and its impact upon the teachers and administrators (SoC 2 Personal Concerns). Later sessions for teachers were designed to build teachers' skills in actual instructional techniques. These sessions were most often conducted by the District mathematics specialists. The first sessions usually involved several schools and were designed for resolving Informational and Management concerns. The latter sessions were school center based, are ongoing, of a support and facilitating nature, and designed to alleviate Management concerns.

The institutionalization of the Elementary Unified Mathematics Curriculm and the ongoing implementation of the other areas of the Unified Curriculum (i.e., elementary communication skills program; secondary courses at all levels in four core areas) has been greatly facilitated by the utilization of resources external to the school center. Some of these have been within the district and other assistance has come from outside the Palm Beach County School system.

Content support for teachers and principals has come primarily from subdistrict mathematics specialists (there are 4 sub-districts in the county school system). These persons served as consultants to individual schools within their jurisdiction, both in content and in the implementation process. Their ongoing support over a three-year period contributed to a large number of teachers reaching Routine Level of Use during that time. They provided both individual and group assistance and responded to concerns expressed by teachers in the respective schools served.

Also on call to provide support for personnel involved in this change were professors from a nearby public university, Florida Atlantic University. One of these professors was assigned full time for a two-year period to work with the Palm Beach County Schools' Department of Professional Staff Development and Teacher Education Center. His support was most valuable in assisting faculties.

Policy Level Personnel: Assistance to Decision Makers

The major source of outside assistance, however, was that which came throughout the implementation period, from the Research and Development Center for Teacher Education, University of Texas at Austin. This support came in several forms. R&D Center staff provided both initial and follow-up inservice activities for principals. These activities were designed to develop administrators' understandings and skills in two most appropriate areas: (1) how to identify and resolve teachers' concerns about the Unified Curriculum, and (2) how to determine the Level of Use of the Unified Curriculum and subsequently how to take steps to allow teachers to increase their Level of Use of the program.

Decision maker consultation. The R&D Center staff also served as consultants to the central staff of the Palm Beach County Schools during the implementation process. This process involved not only workshops involving central staff, but also providing advice and opinions concerning the progress of the implementation effort. The consultations were provided in several ways: (1) via telephone; (2) face-to-face formal meetings; (3) informal gatherings; and (4) formal written reports. This advice was based on several different data sources: (1) formal Stage of Concern (SoC) questionnaires administered to teachers; (2) brief SoC interviews of teachers and principals; (3) Levels of Use interviews of teachers; (4) telephone reports from

principals, area and central staff; and (5) personal observations. No individual person or school data were shared; all were viewed as confidential at the school level.

Policy development. Reports from the R&D Center staff were usually filtered back to top decision makers through the Department of Professional Staff Development and Teacher Education Center. Thus, those charged with the overall direction of both the development effort and the implementation process were furnished objective data upon which to systemtically consider and make decisions including program modification and program implementation. For example, throughout year one of the math program implementation, teachers continued to express their opinion that the math program would not really remain, that it "would fade away." They believed this to be true based on the history of other programs that had been introduced in the district. They were concerned about this for two reasons: first, they thought the new program was good in that it served as a guide that provided a consistent program to all pupils, regardless to which school they were assigned; second, teachers had given a great deal of time and energy to the program and they did not want to see this wasted with a start on yet another "new" program. In the second year when the central office/superintendent level administration became convinced that this situation still existed, a precisely ordered intervention was directed from the superintendent: all sub-district "area" superintendents were to visit each elementary faculty in their repsective area, to indicate clear commitment to the Unified Math, to demonstrate interest by soliciting teachers' comments and feedback, and to do this in a highly visible, personalized way for maximum impact. The policy message to be conveyed was that the district was adopting and implementing long range curriculum programs

and that, unlike previous years, the expectation was that the program would be used, and for quite a long while.

A second example of policy level activity was a change in the superintendent level decision makers' time line for curriculum implementation. In the initial plan math would be implemented in one year, and in response to state level mandates, a second innovation was to be introduced to the schools at the outset of the second year of implementing math. After a few months, the upper administrative levels became aware of the fact that teachers were overwhelmed because of 1) still working to become comfortable with math, and 2) trying to cope with the idea of a new curriculum program. The game plan was changed and an option was announced by a superintendent's memo to all schools -- the school should adjust their implementation time table in order to respond to teachers' concerns; "slowing down" was okay.

Monitoring and Evaluation

Data for monitoring purposes were collected throughout the implementation process using several techniques and sources.

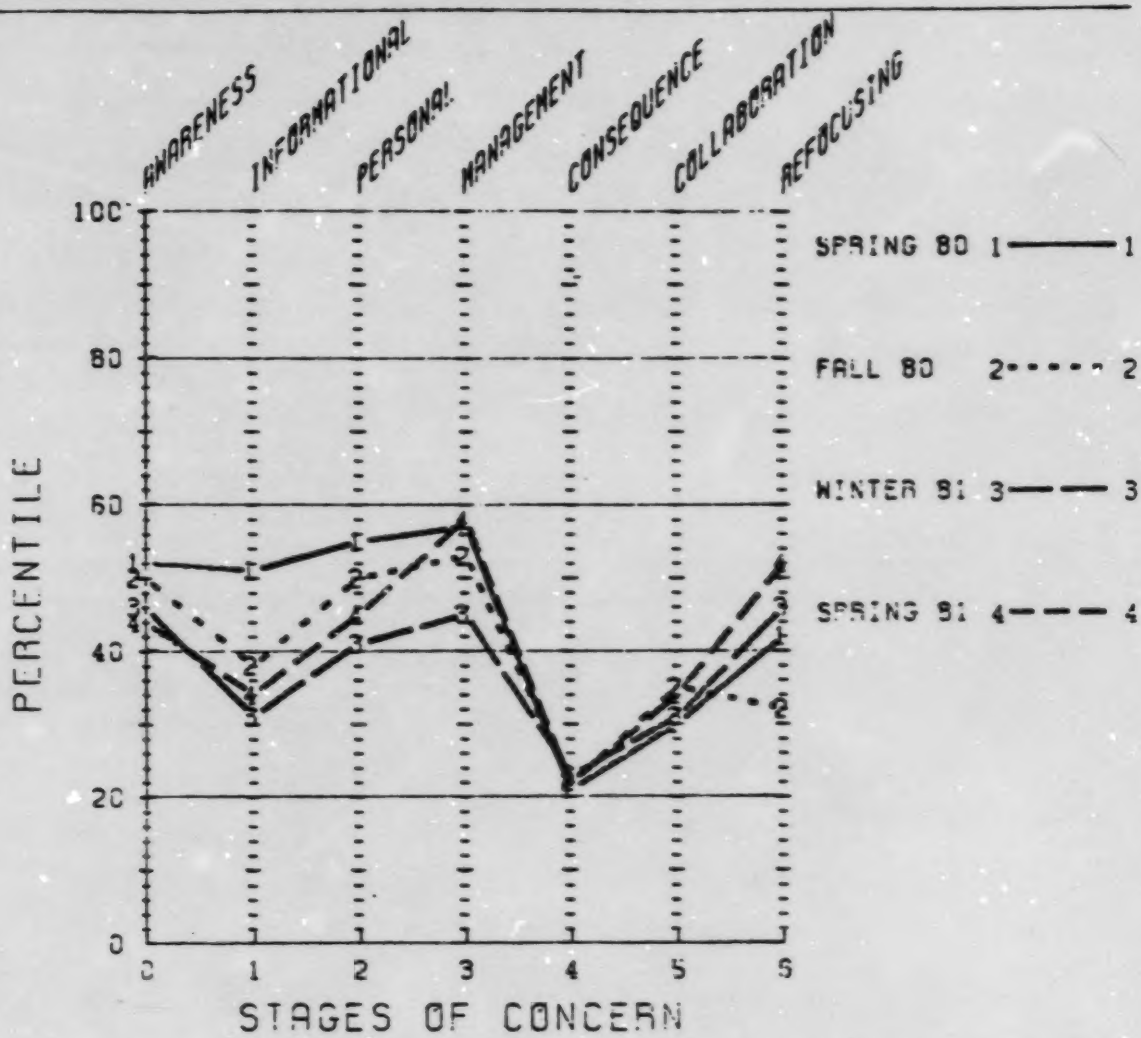
Program. Quarterly feedback from all teachers about the content and materials of the new curriculum was collected by central administrators. At the end of the first implementation year, an opinionnaire collected a variety of information about the new math program from all involved teachers, on an anonymous basis. Program revisions incorporating the teacher feedback were made.

Teacher Change. Teacher SoC, LoU and Innovation Configuration data were acquired from selected target schools on a periodic basis. These data were shared with principals and assistant principals so that they could provide data-based support to the individual teachers. As an example the Stages of

Concern and Levels of Use data from one of the schools, School A is presented in Figure 11. These data indicate there was a change of teachers' concern about the Unified Curriculum during the implementation process. The first concerns data collection point, Spring 1980, was at the end of the first year of implementation of the new math program. As data were collected three times during the second year of use Stages 1, 2, 3 concerns tended to decrease with Stage 6 Refocusing generally increasing over time. An exception to the decreasing Stage 3 Management concerns occurred toward the end of the school year, Spring 1981, data point 4. Teachers in several grade levels discovered late in the year that they were "running out of time" for finishing the instructional program with their students. This realization caused their Management concerns to elevate to the same intensity as period 1. School A teachers' Levels of Use of the program (Figure 11) changed from the majority of teachers at LoU III at the end of year one, Spring of 1980, to a significant number of teachers reaching the Routine Level of Use at the end of the second year of the implementation process. It appears that inservice training and other interventions delivered by principals and others were effective in helping teachers in their implementation efforts. Additionally, it was found that teachers changed in the way they used the materials in their classrooms, that is, the way they used the different configuration component parts of the Unified Curriculum.

Student Change. Data collected over the last several years from State Assessment Tests show positive progress of students' achievement since the implementation of the Unified Curriculum. For example, in 1981, third grade students across the district scored above state averages in 11 of 14 standards assessed on the mathematics test sections, and in 1981 fifth grade pupils scored at or above state norms on 14 of 24 standards assessed (see Figure 12).

Figure 11
School A - Group Profile
Complete Data



LEVELS OF USE DISTRIBUTION

	0	I	II	III	IVA	IVB	V	VI
SPRING 80	1	0	0	11	4	1	0	0
FALL 80	0	0	0	6	9	2	0	0
WINTER 81	0	0	0	0	0	0	0	0
SPRING 81	0	0	0	2	11	4	0	0

FREQUENCY AT EACH LOU

Figure 12

COMPARISON OF SSAT SKILL ACHIEVEMENT

FOR PALM BEACH COUNTY AND FLORIDA

1977 - 1981

GRADE 3

MATHEMATICS

YEAR	NUMBER OF SKILLS TESTED	ABOVE STATE NORM	ON STATE NORM	BELOW STATE NORM
1978	14		1	13
1979	14	1	2	11
1980	14	6	2	6
1981	14	11	3	

GRADE 5

MATHEMATICS

1978	24			24
1979	24			24
1980	24		5	19
1981	24	7	7	10

These gains are dramatic increases over 1978 pre-Unified Math implementation assessments.

Fifth grade student scores from School A (Figure 13) show little gain in achievement on the state assessment test from 1978 to 1979. The 1979 tests were administered to students in the fall two months after the teachers began use of the new math. The 1980 scores showed no additional improvement in student gains. During this period teachers use of the program was at the Mechanical Level of Use III, not having the program yet stabilized. But, by the 1981 test administration teachers had experienced two years of use and had moved to LoU IVA, Routine -- and students increased to 94% achievement, a gain of 13 percentage points over the previous two years scores. A similar, but not so dramatic, gain is seen with the third grade achievement. Figure 14 provides some explicit examples of student gains on specific skills tested.

Principals. While overall direction and commitment came from the district central offices the actual responsibility for implementation came from the school center with the principal (headmaster) being accountable for his or her teachers' use of the materials. A new instrument for monitoring principals' facilitation concerns, the Change Facilitator Stage of Concern Questionnaire (CFSoCQ) (Rutherford, Hall and George, 1982) was used to identify the most intense concerns of the three case study principals during 1980-81. Periodic assessments made during this yearlong research effort permitted the identification of principals' concerns as they changed across time.

An example is provided in Figure 15. At three points in time, the principal's concerns were assessed. The first period was at the beginning of the second year of math program implementation in the fall of 1980. Note the high intensity of Stage 4 Consequence and Stage 3 Management concerns. The consistent high peak on Stage 0 Awareness suggests that the principal was not

Figure 13

STATE STUDENT ASSESSMENT TEST COMPOSITE SCORES 1978-1981
SCHOOL A

	1978	1979	1980	1981
Grade 3	89%	90%	89%	96%
Grade 5	77%	81%	81%	94%

Figure 14

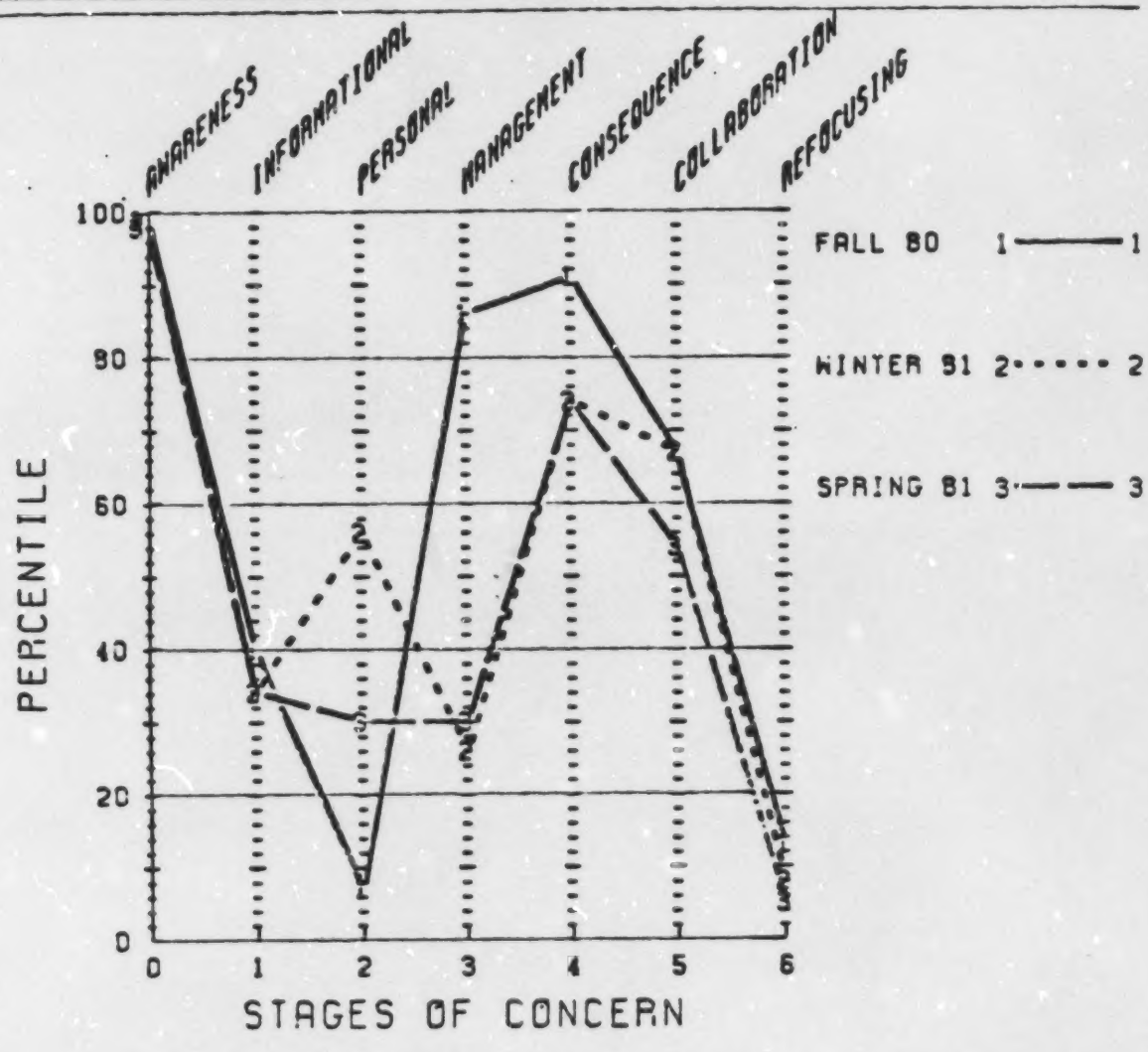
EXAMPLES OF SKILLS ACHIEVEMENT SCORES ON SSAT

School A

Grade 3	1978	1981
Identify fractional parts of regions that have been separted into halves, thirds, or fourths.	77%	94%
Subtract a 1-digit number from a 2-digit number, without regrouping.	79%	94%
Use subtraction without regrouping to solve real-world problems involving two purchases totaling no more than 50¢.	71%	83%

Grade 5	1978	1981
Round a whole number less than 100 to the nearest ten.	72%	100%
Identify equivalent fractional parts of regions that have been separated into halves, fourths, fifths, eights or tenths.	84%	99%
Divide a 3-digit number a 1-digit number with remainder zero, without regrouping.	61%	81%
Add two proper fractions having like denominators, without simplification.	69%	89%

Figure 15
School A - Principal



unduly concerned about facilitating the program and was not troubled by it. At the second data collection in the Winter of 1981 the Management concerns decreased, but Stage 2 Personal concerns increased a good deal then fell back to a lower level later in the year, Spring 1981. This principal's Stage 4 Consequence and Stage 5 Collaboration concerns were consistently at "peak" levels across all data points.

The student change, teacher change and principal change data all portray a picture of positive growth and development related to the innovation as experienced by all individuals involved in the change effort.

Indepth data collections and documentation allowed close examination of the "interventions" made by the principals with each representing one of the three basic types of change facilitator models. These three facilitator types are identified as: responder, manager, initiator (Hall, Rutherford, Griffin, 1982). Classification into one of these categories was based primarily on a general impression or "perceived Gestalt" as to how the principals reacted when faced with the necessity to change. One indication of their reaction was measured by the CFSoCQ (see Figure 15).

Responder principals, as a rule, take no initiative on their own to help faciliate change in their school centers. They are seemingly content to follow directions serving mainly as a conduit for administrative directions which come from a high authority. Manager principals may be primarily concerned with addressing the logistical aspects of the implementation process, thus enabling the new program to function smoothly. They, however, seem to be a somewhat flexible type and may seem at times to simply respond to situations or they may initiate some actions to facilitate use of an innovation. Initiators, on the other hand, present themselves as persons who take firm, decisive (albeit not always proper) action to assist in

implementation. This may range from actually developing and conducting workshops on the innovation to devising novel and creative uses of resources to facilitate implementation. This type of principal might best be described as independent or autonomous. It appears from data analyses presently underway at the Texas R&D Center that the faculties of Initiator and Manager type principals score higher in terms of implementation success than the faculties of Responder style principals. Implications of the "style" of the principal for the outcomes of implementation have been recently found by other researchers (Kwantes and Rohde, 1982).

Clarification and documentation of these three types of facilitator models once again highlight the need to view change as a personalized process. Just as each of these three types of principals differ in some fashion in their interventions with teachers and in their implementation effectiveness, so do their support needs for the implementation process vary. This variance in changing concerns and the need to support them accordingly exists both at any one point in time and across time, pointing out the need to view school change and improvement at all levels as a continuous process that does not simply just happen.

Epilogue

Much was learned in Palm Beach County as a result of this first systematic support effort of developing and implementing a curriculum innovation for school improvement. Among the most important points are:

1) Newly developed materials for programs need to have not only pilot testing but extensive field testing in a variety of user settings in order to identify errors and problem areas. Because of immediate pressing needs the program was introduced to teachers before materials were completely

developed. The quality, or lack of quality, the materials affected teachers very negatively, increasing their frustration during the initial implementation activities. This lesson was sorely learned; improved materials, when they were delivered, were immensely appreciated by the teacher users.

2) On the positive side, principals do affect teachers' implementation and use of new programs and this was dramatically demonstrated by many of the actions taken by principals, and documented by the researchers along with related effects on teachers. Principals can influence teachers and there are now new data and insights into what they do to do this.

3) Principals, like students and teachers, do not benefit very much from one or two day "hit and split" training workshops. The principals who volunteered and received more frequent, shorter segments of CBAM facilitator training with feedback and coaching were better implementors of CBAM, an innovation for implementation and use by principals to aid them in supporting teachers in their implementation and use of the new math program.

Revisiting the Two Cases

In the preceding sections two major case studies of school improvement have been summarized. In terms of the organizing framework presented in Figure 1, all three phases of the School Improvement Process were represented. In both cases the needs for change had risen out of local issues and concerns. In each case there was a School Review. The reviews involved many schools and teachers as well as school district administrators. The problems being considered included the needs of individual schools and teachers and at the same time represented shared concerns and larger issues than could have been solved by each school independently.

The Solution Selection/Development process was approached in similar ways by both districts. The various curriculum materials that were available were surveyed. Then both districts decided to develop their own specialized materials that were closely linked to specific commercially available instructional resources. In the JeffCo case the district already had formal policies and procedures for curriculum development. These policies required teacher and community involvement, pilot and field test activies and several checkpoints and sign-offs before an innovation could be adopted by the district. For Palm Beach this was their first major attempt at curriculum development, which probably accounts for much of the materials related problems that were encountered during implementation.

For both districts, the Solution Implementation phase was approached in a new way based on resources, research findings and the involvement of Texas R&D staff. Implementation was recognized to be a process and the intervention "game plan" was developed and modified in terms of teachers Stages of Concern and Levels of Use and the Innovation Configurations being implemented.

Both cases of improvement were quite successful in terms of reaching their articulated goals. The JeffCo objective was to have every classroom teacher teaching the newly revised inquiry-approach science program, so that all students would be exposed to and involved in a process of hands on, student centered curriculum, experiencing the behaviors and activities of scientists. Since science is not considered to be a "basic skill" discipline, it is not subject to the close scrutiny of student evaluation that the typical basic skills are. In fact, no well accepted nationally standardized science achievement test at the elementary level exists. Therefore, it is difficult to deal in a singular way with student achievement in science. Thus, student scores did not appear to be a primary goal though student achievement was

documented at the sixth grade level. Therefore, the JeffCo game plan reflects an emphasis on teachers by the implementors. It was expected that if teachers could be supported and learned to demonstrate the behaviors required by the program then multiple student outcomes would be a pay off. Implementation was deemed successful and district policies about development were refined and new policies about implementation were established.

The dual role functions of developing and implementing were assigned to the same facilitators and proved to work well. Having designed and developed the program, the science coordinators had strong interests in seeing that it was used by all teachers in the most faithful ways possible. In following up on implementation support the JeffCo facilitators found that implementation increased when principals received special training and assistance.

In contrast a strong connection between the design and implementation facilitation roles was absent at Palm Beach. The courtship, early wooing and marriage of these two staff groups never occured or dwindled into early divorce, for articulation between the two curriculum components was poor at best. However, it is very clear that the district accomplished its goal, despite the lack of meticulous and detailed attention to teacher implementation. The emphasis on the learning objectives of the program and student testing for achievement of the objectives led to exactly what was desired, higher student achievement scores. In Palm Beach concentrated attention was given from the beginning to preparing principals for and working with them in facilitating implementation at the classroom level, though the lack of early communication by the district about expected teacher use of the new program hindered principals support. However, key interventions from the policy level were influential in clarifying the direction of the improvement effort.

Discussion and Summary

Much was learned in these school improvement efforts. Coordination and support of implementation across many schools was shown to be possible. And it was demonstrated that district wide development and implementation efforts can succeed when the criterion for success are teacher's use of the innovation and increased student achievement. Another important outcome of this work is confirmation of the key principles of the ISIP Project. The school improvement process can work if appropriate facilitation, resources and time are available and used effectively.

There are also several perplexing issues and dilemmas. These could become the basis for another full length paper, however for the sake of brevity only a short list of key principles and issues is presented in the remaining pages of this paper.

"Musts" for facilitating school improvement

1) The innovation processess and materials should be pilot and field tested before implementing with all users. The JeffCo science materials and Teacher Guide were given extensive pilot testing, field testing and revision before they were made available to all teachers. In the Palm Beach case, materials were rapidly produced and immediately sent to all teachers. In some instances teachers were expected to use materials that were not yet available. The consequences in Palm Beach was more variation in configurations, less clarity of expectations at the school level and more Management and Informational concerns on the parts of teachers and principals.

2) Provide more personalized assistance to principals as they carry out their change facilitator role. Principals are people too. They are also individuals. All too frequently it is assumed that principals will understand and be able to carry out their change facilitating responsibilities simply by being directed to do so. Palm Beach and JeffCo principals received advance information about what would be expected of them and their staffs. Further, principals, particularly in Palm Beach, received specialized training prior to their teachers receiving training. Ongoing consultation and training was provided during the implementation phase. When the school leader knows what is to be done, s/he is in a much better position to clarify practices and to assist staff in accomplishing the tasks. In another recent study Matthews and Suda (1982) report that researcher-provided diagnostic information about teachers Stages of Concern could be very useful to principles as change facilitators.

3) Collect Stages of Concern and Levels of Use data before and at regular intervals during the school review and implementation phases. Change is a process for individuals, groups and institutions. Having standardized information at regular intervals can help all parties to better understand and facilitate the change effort. The SoC, LoU and IC information can also be helpful in communicating with outsiders about progress that is being made. In both districts these data were useful to district level facilitators in communicating with policy makers about the progress that was being made. In recent work in Belgium and the Netherlands van den Berg and Vandenberghe have found this approach to be very helpful in planning and monitoring (1981). In addition, with these

kinds of data policy makers are able to see change as a process rather than as an event.

4) Develop as much clarity and consensus about the operational components of the innovation before implementation. When all parties have had input into expectations and have common understanding about the allowed variability in use of an innovation, implementation efforts will occur with less confusion and uncertainity. The JeffCo case is a good illustration. The key components of the innovation were agreed to in advance and descriptions were made available to all parties. As a consequence everyone had the same understanding of the limits in adaptation and their minimum responsibilities as well as opportunities. Mid course corrections were made when necessary and all parts of the system held a common image of where they were going.

5) Provide workshops over time and have them targeted to teacher/principal concerns. For most changes, limiting formal training to pre-use "launch" workshops is not sufficient. As is illustrated in both the JeffCo and Palm Beach experiences, formal workshops were offered over time and were based on formal and informal assessments of participant concerns. With this approach timely interventions can be made to address concerns as they change.

6) Developers of innovations should be directly involved in facilitating implementation. In Palm Beach the developers were not engaged in providing school and classroom level implementation assistance. The consequence was that persons who were assigned to facilitating implementation did not understand the intricacies of the innovation and they did not believe as strongly in the innovation as did the original developers. The result was discontinuity between developer

ideals and actual use of the materials and processes. Another consequence was a great deal of individual facilitator interpretation of what use of the innovation meant which led to unanticipated increases in innovation configurations.

7) Develop an intervention Game Plan in advance. Thinking out the overall design of interventions that will be needed to support a school improvement effort and doing this in advance is critical. Without advance planning the day to day crises and problems that are a natural part of all change efforts tend to overshadow the larger picture. With advance planning, all of the interventions such as workshops, newsletters, new staffings and day to day comfort and caring, can be more closely interrelated and made to compliment each other. This does not mean that the intervention game plan should not be changed with experience. Indeed it should be constantly under review and refinement. Without the game plan in advance, there tends to be less overall continuity and support. The Stages of Concern, Levels of Use and Innovation Configuration data can be very helpful for making decisions about the various adjustments that are needed. They can also be used to monitor the effects of the adjustments in the intervention game plan.

Issues for discussion

In addition to supporting the ISIP guiding principles, the case experiences reported have also stimulated many conceptual and practical issues among the participants. Some of these are more theoretical in nature, while others appear to be differences in interpretation of the school improvement phenomena. The following sampling of issues are offered to stimulate discussion and thought about how school improvement might be approached in the future.

1) School Self Review and Implementation

The ISIP project advocates a comprehensive school review process as the cornerstone of successful school improvement. This process, as we understand it, requires a school to engage in a series of steps and processes that include developing an analysis of problems and needs and identifying possible solutions. The review process also entails the use of an outside consultant. Out of the school review process "solutions" will be identified. What are the mechanisms for implementation of these solutions? In the Concerns Based model the School Review process, Solution Selection/Development and Implementation of the Selected Solutions would be seen as "innovations." Stages Concern, Levels of Use and Innovation Configuration data could be collected during all three phases and in relation to the School Review process, the Solution Selection/Development and for Implementation of the Selected Solutions.

2) Local School vs. Multi School Change

There are many who place heavy emphasis on individual school improvement. As admirable as individual school improvement efforts may be in an egalitarian sense, one reality of this approach is that each school will seek the beat of its own drummer with little or no systematic coordination with what other schools are doing. In addition, it is highly unlikely that a single school staff can replicate the vast knowledge and experience base of curriculum theory, program development, evaluation, learning theory, etc. that are required to develop and implement educational improvements. More resources are available if a larger system such as a district or state education agency is involved in school improvement.

How can the strengths of individual school autonomy be matched with the extensive bodies of knowledge and expertise that are needed to develop and implement quality solutions? Without some sort of larger design each school runs the risks of reinventing wheels and many will attempt to implement untested solutions.

3) Top Downism

There is a tendency to view the types of change efforts described in this paper as having been unilaterally directed out of the central office of the school districts. Frequently these types of efforts are labeled as "top down" and the implication is that they can't work. It could also be argued that they were not "top down." However the cases reported here were successful. The efforts were directed and coordinated out of the central offices of the respective districts but teachers and parents had input into and influence over the review, development and implementation phases.

Even with a single school there will be differential teacher involvement with some being closer to the process than others. Rather than striving to have all teachers actively involved in every element it could be much more personalized for teachers to have opportunities to be involved as they choose and for the improvement effort to have built in mechanisms that keep all teachers informed and regularly updated.

It does not appear that the "top down" improvement strategy in and of itself is an indicator of potential for success or failure in a change effort. Rather success or failure is dependent upon the many interventions that must take place to fulfill a top down or grass roots strategy. Judging success or failure of a top down strategy is closely linked to the criteria. If the criterion is teacher control over the

change process then, by definition, top down strategies will be rated lower. However, if the criterion is successful implementation at the classroom level or increased student achievement, then very different judgments could be made.

It appears that the School Review Process can be based on a top down strategy. That is, the school review process is required, it is built into the the definition of school improvement. The selection of problems and solutions is open to local option. In either case in terms of some criteria there are "successful schools" that do not use single school review processes.

4) Principal Overload

The school improvement efforts described in this paper place heavy responsibilities on the school principal. In addition to their normal job load, they must shoulder major new responsibilities and use specialized skills to effectively facilitate school improvement efforts.

To prepare principals for this intensive role and to help them carry it out requires specialized training that can only be effective if provided over time and closely linked to follow up and on the job coaching. In both the JeffCo and Palm Beach experiences principal training was seen as crucial. Palm Beach learned from JeffCo and did even more principal training early in their effort. Both districts would argue that even more attention should be given to principals in future improvement efforts.

Recent research findings at the Texas Research and Development Center would reinforce this need (Hord & Goldstein, 1982; Hall, Rutherford & Griffin, 1982). These findings point out that typically the principal does not work alone. The effective principal works in

collaboration with an assistant principal or lead teacher and together they provide the needed facilitation for their teachers. In developing models of school improvement and thinking about the key factors that must be present, more consideration should be given to the role and dynamics of this on-site change facilitator team.

5) Memory Loss

A consistent finding in CBAM studies has been that participants in change efforts forget or do not accurately remember their past experiences. For example, although teachers were systematically surveyed and representatives were involved in developing specificiations for the Revised Science Program in JeffCo, and for Unified Math in Palm Beach, three years later many teachers claimed to have had no input.

In another CBAM study, teachers were systematically asked about particular interventions that had occured during the change process. Interventions were nominated that were seen as critical. Special workshops and key events in staff meetings where there had been much debate or in which strategic agreements had been worked out were identified. When teachers were asked to recall these, a large percentage of teachers did not remember the interventions at all or attributed the consequences to other interventions. They would have a tendency to remember themselves as having accomplished more of the decisions and tasks by themselves with less influence from others than the historical record indicated. One important question is, how can change facilitators maintain sufficient contact with all prospective users throughout a school improvement effort so that teachers continue to maintain ownership of the process and decision?

6) Teacher Involvement

The point above leads to a related one. There is an assertion in recent times that all teachers should be involved in all decisions. A variation of this theme is that the only things that are credible to teachers are things that other teachers develop and present. Undoubtedly union representatives have an interest in this position, but their reasons have little do with school improvement.

It appears that many teachers are not desirous of having "input" on every decision. In fact many teachers recognize curriculum developers, central office personnel, and college faculties as having useful ideas about teaching, school and student needs. Teachers have been heard to say "I don't want to spend all of my time in committees and filling out questionnaires. If you have something that will work well with my students then I will try it. I want to teach, not do all of these other things." How do we balance the trust and desires of these teachers with the heavy requirements that a school review process demands?

In Summary

In this paper we have summarized seven years of collaborative efforts involving practitioners and researchers. The shared agenda was to accomplish school improvement and to research the process. The overall conclusions are many but can be summarized as follows:

> Large scale school improvement efforts involving many schools can be successful when facilitated by principals and other internal agents and supported by external agents.

We would further conclude that the School Review process is the first phase; the phases of Solution Selection/Development and Solution Implementation are equally important. And we would propose that in

future research on the improvement process that the concerns based perspective can be useful in monitoring and planning for all three phases.

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